REBUTTAL TESTIMONY OF

ERIC H. BELL, P.E.

ON BEHALF OF

DOMINION ENERGY SOUTH CAROLINA, INC.

DOCKET NO. 2019-226-E

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A. My name is Eric H. Bell. My business address is 220 Operation Way, Cayce, South Carolina. I am Manager of Economic Resource Commitment for Dominion Energy South Carolina, Inc. ("DESC" or the "Company").[1]

Q. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY IN THIS PROCEEDING?

A. Yes, I have.

Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A. The purpose of my rebuttal testimony is to respond to the direct testimony of the South Carolina Office of Regulatory Staff ("ORS"), the South Carolina Solar Business Alliance, Inc. ("SCSBA"), the Sierra Club, the South Carolina Coastal

[1] SCE&G changed its name to Dominion Energy South Carolina, Inc. in April 2019, as a result of the acquisition of SCANA Corporation by Dominion Energy, Inc. For consistency, I use "DESC" to refer to the Company both before and after this name change.

Conservation League ("SCCCL"), and the Southern Alliance for Clean Energy ("SACE").

In many cases, these witnesses suggested changes to Dominion Energy South Carolina, Inc.'s 2020 Integrated Resource Planning Report ("2020 IRP") to address what they have identified as errors, inconsistencies or potential improvements to the plan. The Company has carefully considered those suggested changes, which overall are helpful and constructive. In many instances, the Company agrees in whole or in part with the suggested changes. Where that is the case, and where it was practical to make the changes in the 2020 IRP, the Company has done so.

The results of these changes are presented in the supplemental analysis (the "IRP Supplement") that is attached to this testimony as Exhibit No.___ (EHB-3). The changes made reflect, in whole or in relevant part, effectively all of the changes that ORS suggested should be made in the 2020 IRP. (As to one suggested change, as I discuss later, the review did not support making the change which ORS had suggested.) I also respond to the changes or improvements that the ORS suggests should be made in future IRP filings. In all or nearly all cases, these are changes the Company is willing to consider in consultation with ORS and the other parties as it prepares future IRPs or IRP updates.

In certain other cases, we have found that suggestions or critiques, however well-intentioned, were misaligned with DESC's electric system, its reliability commitments, the planning and modeling methodology used, or the relevant data.

Along with the Company's other rebuttal witnesses, I will attempt to point out where that is the case and why the Company disagrees with the suggestion or critique. It is not practical to address every concern raised given their number, and we have not attempted to do so. Our goal has been to address as many of the important and relevant suggestions and criticisms as we can while primarily focusing on the changes recommended in the report issued by J. Kennedy and Associates on behalf of the ORS ("ORS Report").

Q. ARE YOU SPONSORING ANY EXHIBITS WITH YOUR REBUTTAL TESTIMONY?

A. Yes, as indicated above, I am sponsoring Exhibit No.___ (EHB-3), which is the IRP Supplement. The IRP Supplement is a revised version of Section II.B.5 of the 2020 IRP. It presents the results of revising the IRP models to include the suggested changes pointed out by the ORS and other parties. The IRP Supplement also provides additional charts and tables as requested by ORS in its testimony. The IRP Supplement now attaches 24 spreadsheets showing the annual resources additions, resource retirements and resulting winter and summer reserve margins for each of the eight resources plan over a 30-year planning horizon as the timing of resource additions have been tailored to fit the three DSM-related demand scenarios that are considered. The Company's witness, Mr. Neely, discusses the specific changes made to the IRP models in more detail in his testimony while I provide an overview of the revised modeling and results.

I am also sponsoring Exhibit No.___ (EHB-4), which includes the recalculation of the repair or retire analyses conducted on the Wateree Units. These analyses were initially conducted after the 2020 IRP studies were completed and are based on different data sets. These studies are not part of the 2020 IRP. They have been changed to reflect certain errors identified in the ORS Report.

CHANGES MADE TO THE 2020 IRP

Q. CAN YOU SUMMARIZE THE CHANGES THAT WERE MADE TO THE IRP MODELING IN RESPONSE TO ORS'S RECOMMENDATIONS?

A. Yes. ORS's witness Mr. Sandonato listed sixteen items that ORS requested to be changed or assumptions that ORS requested to be reevaluated in the 2020 IRP. These recommendations were in addition to suggestions to expand the number of charts presented in the report and re-run the repair or retire analysis for Wateree Unit, each of which have been done. Many of these sixteen remaining requests overlap with concerns or changes suggested by witnesses for the intervenors, so in addressing ORS's requests we are addressing a number of the intervenors' concerns as well.

Q. CAN YOU ITEMIZE ORS'S SIXTEEN REQUESTED CHANGES?

A. Yes. Chart A presents the sixteen changes or reevaluations that ORS requested in tabular form. The numbering reflects the item numbers given in ORS witness Mr. Sandonato's testimony:

Table A: Numerical Changes Incorporated in the IRP Supplement

ORS Report Item Number	Short Description of ORS's Immediate Changes
13	Revise the Escalation and De-Escalation Factors for Solar and Battery Costs
14	Review and Revise Capital Costs for Internal Combustion Turbines ("ICTs")
15	Review and Revise Fixed O&M for Solar and Battery Assets
16a	Review and Revise Variable O&M for Gas-Fired Units
16b	Review and Revise Fixed O&M for Gas-Fired Units
21	Escalate the Cost of Peaking Purchases (off-system sales and purchases)
22	Include Tables that Show the Ranking of All RPs Under All Sensitivities
23a	Correct Certain Identified Spreadsheet Errors
23b	Include AFUDC Costs in Fossil Unit New Construction Capital Costs
23c	Escalate Capital Cost of Coal Unit Effluent Limitation Guidelines ("ELG") Assets
23d	Add Ongoing Fossil Plant Capital Costs
23e	Revise End of Life/Life Extension Costs for Battery Storage ("BESS") Assets
23f	Include Investment Tax Credits in the Capital Cost of Solar and Battery Storage
23g	Review Retirement/Dismantlement Costs for Fossil Units
23h	Correct ELG Costs and Depreciation Assumptions
23i	Add Gas Firm Transportation Costs for Large ICT
23j	Include Costs of an ICT to Be Added in 2040 that Was Omitted in RP8
23k	Revise the Cost Escalation Assumption for Final 10 Years of the Studies

As indicated earlier, with limited exceptions DESC has made all of ORS's immediate changes as recommended for the 2020 IRP. DESC also has conducted the requested reevaluations and made changes to the analysis where those reevaluations indicated that it was appropriate to do so.

Q. WHICH OF ORS'S SUGGESTED CHANGES WERE NOT MADE?

A. Only one of the changes ORS requested to be made in the 2020 IRP was reviewed but not made. Mr. Sandonato suggested at Item 23(g) that the Company should include in its model an additional value for dismantlement costs, site

restoration costs, and incremental transmission costs necessary for post-retirement voltage support for existing resources potentially subject to early retirement. DESC evaluated this request and determined that it would likely result in double counting or overstating of costs, so declined to include it.

Q. PLEASE EXPLAIN WHY THIS SUGGESTED CHANGE TO ADD DISMANTLEMENT COSTS WOULD LIKELY RESULT IN DOUBLE COUNTING OR OVERSTATING OF COSTS.

A. As Mr. Neely discusses as well, the annual depreciation expense charged against generation assets is intended to recover, among other items, the cost of removal of the associated asset at the end of its useful life. Because depreciation expense is already included in the IRP model, inserting an additional component of dismantlement costs and site restoration costs could create double counting of some or all of these expenses. As to transmission costs, the Company expects to have additional costs because of retirements, but the magnitude of those costs are project specific and cannot be roughly estimated to any useful accuracy. Transmission expense for a retirement can only be quantified in a full retirement study. A retirement study is a snapshot reflecting specific circumstances at that time of the retirement. Such studies have not been conducted as of the 2020 IRP.

For these reasons, DESC declined to make the suggested changes related to adding additional dismantlement costs and site restoration costs or additional transmission costs to the model. As discussed below, DESC intends to study these

issues further. If those studies support recognizing additional costs, they will be reflected in future IRPs or IRP updates. But there is no basis for recognizing additional costs now.

Q. ORS ALSO REQUESTED THAT DESC REEVALUATE MULTIPLE COST FACTORS OR OTHER ITEMS. WERE ALL OF ORS'S SUGGESTED REEVALUATIONS CONDUCTED?

A. Yes. All of ORS's suggested reevaluations were done. Where they indicated that changes were appropriate, those changes were made.

Q. DID ALL OF ORS'S SUGGESTED REEVALUATIONS RESULT IN A CHANGE TO THE RELEVANT FACTORS?

A. No. Not all factors that were reevaluated required revision. Specifically, Mr. Sandonato suggested at ORS Item 14 that the Company should reevaluate the capital cost of certain gas-fired large-frame ICTs. The ORS Report and the testimony of several other intervenors stated that these cost assumptions were too low. The reevaluation, however, showed that the initial cost assumptions were correct. The prices in question are actual prices available to DESC. They represented prices that the vendor has committed to provide Dominion Energy, Inc. and its subsidiaries under a volume discount for ICT units of this type. The large-frame units should not be confused with the smaller and technically advanced aero-derivative ICTs which are more expensive on a dollar per kW basis.

Q. APART FROM THE CHANGES REQUESTED BY ORS, DID ANY OF THE OTHER WITNESSES SUGGEST REEVALUATIONS THAT RESULT IN A CHANGE IN THE SPECIFIED FACTOR?

A. Yes. Based the testimony of SCSBA'S Witness Kenneth Sercy, SCCCL/SACE Witness Dr. David Hill, and Sierra Club Witness Dr. Derek Stenclik, the Company reevaluated its capital cost assumption for battery storage. As Mr. Neely describes in more detail, that assumption was revised and the revised assumption is lower.

Q. DID ANY OF ORS'S SUGGESTED REEVALUATIONS RESULT IN CHANGES TO ONLY PART OF A COST ITEM?

A. Yes. In two cases, the reevaluations determined that only part of a cost item should be revised and the other parts should remain unchanged. The reevaluation of variable O&M costs for gas turbine units (ORS Item 16(a)) showed that the values for existing units required no change, while the variable O&M assumptions for new units required revision. Reevaluating the fixed O&M assumption (ORS Item16(b)) showed no change was indicated for existing units. But the reevaluation of the fixed O&M assumption for new units showed that costs for one of three possible types of new units required revision while costs for the other two required no changes. All of these changes have been incorporated in the analyses presented in the IRP Supplement.

SIZE AND IMPACT OF THE CHANGES TO THE 2020 IRP

Q. AS A RESULT OF THE CHANGES MADE, WHAT WAS THE MAGNITUDE OF CHANGE IN THE RELATIVE LEVELIZED COSTS OF THE RESOURCES PLANS ON A COMPARATIVE BASIS?

A. Mr. Neely has calculated the before-and-after effect of the changes made to the model on two scenarios, the base gas, medium DSM and \$0/ton CO_2 costs scenario (the "Reference Scenario"), and the same scenario assuming \$25/ton CO_2 costs. The magnitude of change in the relative cost of the resources plans was small, less than 2.5%. In other words, within the two scenarios analyzed, the relative cost of any two of the eight resource plans changed by less than approximately 2.5%. A review of other scenarios indicates that the changes in the relative costs of resource plans would be comparably small.

Q. PLEASE EXPLAIN WHY THE RELATIVE CHANGE BETWEEN THE COST OF RESOURCE PLANS IS RELEVANT AND WHY IT IS SO LOW?

A. The purpose of an IRP is to compare the relative costs to customers of alternative resources plans so that, all other things being equal, the most cost-effective plan can be identified. Changes in assumptions which add or subtract costs across all resource plans will offset themselves in whole or in part. For example, if a change causes the same cost impact on all resource plans, the comparative cost of the plans will not change.

Q. CAN YOU GIVE US AN EXAMPLE OF HOW THIS BALANCING OUT OCCURS?

A. Yes. Let me refer to Table B, which shows the percentage change in levelized cost between resource plans under the base gas, medium DSM and \$0/ton CO_2 costs scenario (the "Reference Scenario"). The results from other scenarios are comparable. The column headings reference the item numbers in Mr. Sandonato' s testimony. The change related to battery cost reevaluations is not specifically listed since it has no ORS item number. But it is included in the group of changes in the first column after the "Total." The cost groups are not arbitrary but reflect how costs are output from the PROSYM model and combined in the revenue model spreadsheet.

(Table B is on the next page)

Table B: Relative Changes in Resource Plan Levelized Costs

(Shown by Percentage Change in the Modified IRP from the February 28th IRP)

Resource Plan ID	Total	13,14,23b,23c, 23e,23f,23g,23h	15, 16b	16a, 23a	21	23d	23g	23i	23j	23k
RP1	**16.8%**	0.5%	0.2%	0.1%	0.0%	**15.1%**	0.0%	1.1%	0.0%	-0.2%
RP2	**16.7%**	0.3%	0.2%	-0.1%	0.1%	**15.3%**	0.0%	1.5%	0.0%	-0.6%
RP3	**16.2%**	0.6%	0.2%	0.2%	0.0%	**13.9%**	0.0%	1.5%	0.0%	-0.2%
RP4	**16.6%**	0.4%	0.3%	-0.1%	0.4%	**14.8%**	0.0%	1.5%	0.0%	-0.6%
RP5	**17.5%**	0.9%	0.9%	-0.1%	0.1%	**14.9%**	0.0%	1.0%	0.0%	-0.1%
RP6	**17.2%**	0.6%	0.7%	-0.1%	0.0%	**15.1%**	0.0%	1.5%	0.0%	-0.5%
RP7	**17.4%**	0.6%	0.5%	-0.1%	0.2%	**15.2%**	0.0%	1.4%	0.0%	-0.4%
RP8	**18.5%**	2.4%	1.6%	0.3%	0.3%	**12.3%**	0.0%	1.3%	0.5%	-0.1%
Average	**17.1%**	**0.8%**	**0.6%**	**0.0%**	**0.1%**	**14.6%**	**0.0%**	**1.3%**	**0.1%**	**-0.3%**

Table B shows that the changes in relative cost from individual changes or groups of changes were quite small. Most changes or groups of changes shifted the relative costs of scenarios by a fraction of 1%. The cost groupings are not arbitrary but are the results of how cost totals become available from the PROSYM and the revenue requirement spreadsheets.

Item 23(d), Add Ongoing Fossil Plant Capital Costs, had the greatest impact on the analysis. This change increased the cost of the eight resource plans by an average of 14.58%. It had the greatest effect on Resource Plan("RP")2, which has no early retirements and relies heavily on fossil generating plants. The levelized cost of RP2 increased by 15.3%.

But the cost of all resource plans increased as a result of Item 23(d), and that reduced much of the relative impact of this change. The cost of RP8 was impacted least by the change because it is the plan that assumes the early retirements of Wateree and Williams stations. But RP8 was still impacted by the change to the extent of 12.3%. As a result, the impact of Item 23(d) on the relative cost of the most highly-affected plan, RP2, compared to the least-affected plan, RP8, is only 3.0% (15.3%-12.3%). And that impact is further offset by other changes made at ORS's suggestion. Considering all changes together, the comparative position of RP2 improved against RP8 in the Reference Scenario by 1.8%.

Thus, as you would expect, the relative impact of any given change on the comparative cost of the two resource plans, which is the focus of the IRP, is generally much lower than the impact on the individual plans. Considering all changes in total, the greatest relative impact plan-to-plan in the Reference Scenario is between RP8 and RP3, with RP3 improving its relative cost position vis-à-vis RP8 by 2.3% (RP8 18.5% vs. RP3 16.2%). RP3 involves retiring the two coal-fired units at Wateree Station and replacing them with combined cycle gas-fired generation. This change in relative costs does not, however, change the relative rankings of these two plans.

Q. CONCERNING THE RANKINGS OF THE VARIOUS RESOURCES PLANS, WHAT DO THE REVISED ANALYSES SHOW?

A. The revisions do not change the ranking of the leading plans in the Reference Scenario. As a result of the cumulative impact of the changes, RP2 improved its relative cost advantage over RP7 and RP8 by 0.7% and 1.8% respectively. It lost ground to RP3 by approximately 0.5%. But the relative ranking of RP2 did not change. From a levelized cost standpoint, RP2 is shown still to be the plan that is most cost beneficial to customers under the Reference Scenario, and its cost advantages increase compared to most of the other plans. In the revised analyses, RP2 is ranked first in all nine scenarios involving $0/ton CO_2 charges, as it was previously, and now ranks second in more than half of the nine scenarios involving $25/ton CO_2 charges.

The revisions do change the ranking of resource plans in scenarios involving CO_2 charges of $25 per ton, which, as indicated in the Company's earlier testimony, were closely bunched together under the initial modeling. The IRP Supplement analysis now shows that from the customer affordability and least cost standpoint, either RP3 or RP7 has lower levelized costs than RP8 in all but one of the nine scenarios involving a $25 per ton CO_2 cost assumption. RP7 involves no early coal retirements but envisions the addition of significant amounts of solar and battery storage capacity backed by fast-start gas fired generation to meet future demands.

But RP8, because it involves the early retirement of the Wateree and Williams coal generation stations, remains by far the lowest carbon plan. And the relative cost differences between RP8 and alternative resource plans in a $25/ton

CO_2 scenario remain quite small. In the a \$25/ton CO_2, base gas, medium DSM scenario, the difference between RP8 and RP3 (with is the lowest cost plan) is only approximately 0.06%.

Q. IN SUMMARY, WHAT DOES THE ANALYSIS CONTAINED IN THE IRP SUPPLEMENT SHOW?

A. It shows that the conclusions of the 2020 IRP as originally submitted were correct. The changes suggested by ORS and others to various factors and assumptions, as included now in the IRP Supplement, while helpful and valid, have not changed the overall conclusions supported by the study.

THE WATEREE REPAIR OR RETIRE STUDIES

Q. ORS WITNESS MR. LANE KOLLEN STATED THAT ORS COULD NOT VERIFY THE RESULTS OF THE COMPANY'S IRP IN PART BECAUSE "THE COMPANY IDENTIFIED ANOTHER LOWER COST RP IN RESPONSE TO DISCOVERY." TO WHAT IS HE REFERRING?

A. Mr. Kollen is referring to a series of repair or retire studies DESC conducted after the IRP modeling was concluded. These studies related to an event that occurred at Wateree Unit 2 in late February of 2020.

Q. PLEASE EXPLAIN THE CIRCUMSTANCES SURROUNDING THAT EVENT AT WATEREE UNIT 2.

A On February 19, 2020, a valve issue caused hydrogen to leak into the generator at Wateree Unit 2 which resulted in a fire that damaged the mid-section

of the stator. In response, the Company ran a number of generation planning models to determine whether to repair or retire Wateree Unit 2, or to retire both Wateree Units 1 and 2. This modeling was begun after the 2020 IRP was competed and months after the IRP planning models were configured, which was principally done in the fall of 2019. The repair or retire studies were run while the Company was investigating vendors and pricing for possible repair or replacement. In the end, the Company found vendors willing to provide and install a replacement stator midsection at a favorable price. Given that price, and the needs of the system, the repair of Wateree Unit 2 was determined to be the least cost and lowest risk path forward to meet customer demands. The decision was made to proceed with the stator midsection replacement, and that work has begun.

Q. WERE THESE REPAIR OR RETIRE STUDIES PROVIDED TO ORS?

A Yes. They were provided to ORS in response to a discovery request that sought model runs whether or not related to the 2020 IRP.

Q. WERE THESE REPAIR OR RETIRE STUDIES RELATED TO THE 2020 IRP?

A No. The 2020 IRP analysis had been completed when the repair or retire analyses were performed, and they were performed using different inputs.

Q. HOW DO YOU RESPOND TO THE STATEMENT THAT THESE REPAIR OR RETIRE STUDIES "IDENTIFIED A LOWER COST RP?"

A. The statement that these repair or retire studies identified a lower cost RP is not accurate. The repair or retire studies were based on March 2020 fuel cost and other inputs, not the 2019 data on which the IRP modeling was conducted. What appears to be a lower cost in the later model runs is due to the fact that fuel costs and other inputs had been updated or revised between January 2020, when the 2020 IRP models were run, and March of 2020, when the repair or retire studies were conducted. There are other distinctions between the repair or replace modeling and the 2020 IRP modeling. But as a matter of principle, comparing resource plans modeled on one data set with resource plans modeled with a different data set does not result in a valid comparison.

Q. WAS THERE ANYTHING UNUSUAL ABOUT UPDATING DATA AND ASSUMPTIONS FROM ONE POINT IN TIME TO THE ANOTHER IN MODELING OF THIS SORT?

A. No. Fuel costs, customer demand, maintenance cost and other inputs are constantly changing and require updating. That is why S.C. Code Ann. § 58-37-40 (the "IRP statute") requires IRPs to be updated every year. An IRP plan is a snapshot in time. The system is constantly moving past it. There is nothing unusual about updating data and assumptions from one point in time to the next, as is the case here.

Q. ORS REQUESTED THAT THE REPAIR OR RETIRE STUDIES FOR THE WATEREE UNIT BE RERUN. HAS THIS BEEN DONE?

A. Yes. The studies have been rerun making the change requested in ORS's Item 11, and the results are attached as Exhibit No. __(EHB-4). No change was made in the insurance assumptions since those assumptions were reviewed with our risk management group and were determined to be accurate, as is explained below.

Q. DO THESE CHANGES MATERIALLY AFFECT THE OUTCOME OF THE REPAIR OR RETIRE STUDIES?

A. No. They do not.

Q. DO THESE CHANGES MAKE THE REPAIR OR RETIRE STUDIES COMPARABLE TO THE STUDIES RUN IN THE 2020 IRP SUCH THAT A VALID COMPARISON OF RESULTS CAN BE MADE?

A. No. They do not. The repair or retire studies do not produce results that are comparable to the 2020 IRP studies because they are based on different data sets, inputs and assumptions.

Q. ORS STATES THAT THE COMPANY IMPROPERLY ACCOUNTED FOR THE POTENTIAL INSURANCE PAYOUT IN THE WATEREE REPAIR OR RETIRE STUDIES. IS THAT THE CASE?

A. No. The potential insurance payout was properly accounted for. Under the terms of the insurance policy, if the Company had decided not to repair or replace the stator midsection, the amount of the insurance payout would have been limited to the book value of that asset less depreciation, less the deductible. Making a claim for that small amount would not have been advisable given the potential future

impact on insurance premiums. For that reason, the insurance payout was only reflected in the scenarios that assumed repair or replacement of the stator midsection, where a much larger insurance claim was possible. The potential insurance claim was properly accounted for in the scenarios modeled.

ORS'S RECOMMENDATIONS FOR CHANGES IN THE FUTURE IRPs

Q. WHAT IS THE COMPANY'S RESPONSE TO SUGGESTIONS IN THE ORS REPORT AS TO CHANGES IN FUTURE IRPs?

A. The Company is committed to work with ORS and other interested parties to implement ORS's recommendations for future changes. Specifically, in future IRPs and IRP updates, the Company intends to work with ORS and other interested parties to:

1. Provide a more thorough presentation of its load and energy forecasting methodology in the IRP documents themselves rather than including this information in testimony and exhibits in its fuel cost proceedings or the IRP proceeding as it has done here. (Item 1).
2. Review its residential and commercial peak load forecast methodology and change it as warranted and evaluate the degree to which additional behavioral factors should be included in these forecasts. (Item 2).
3. Expand the number of sensitivities the IRP analyzes to include both DSM scenarios and a range of load growth sensitivity factors as appropriate. (Item 3).

4. Provide a more detailed analysis of its reserve margin methodology and its treatment of VACAR load sharing requirements in future IRP documents. If DESC continues to use two reserve margins for each season, an additional explanation will be provided for this approach in a reserve margin study or appendix to the IRP. (Item 4).
5. Revisit its DSM assumptions and limit high DSM assumptions to reasonable and achievable levels. (Item 6).
6. Reexamine its natural gas forecasts and their relationship to other industry forecasts while expanding the range of forecast sensitivities to provide more variation in range from the base or expected price curve. (Item 7).
7. Provide a discussion in future IRPs of the availability and constraints of natural gas pipeline capacity and supply on the timing, size, and location of potential new CC and ICT resource additions for so long as those issues are relevant to the current IRP. (Item 8).
8. Include additional CO_2 price sensitivities in future IRP scenarios based on appropriate forecasts. (Item 9).
9. Reevaluate its assumption regarding its reliance on generic winter capacity purchases and ensure that any decision to consider those capacity purchases is made based on the availability and economics of the capacity purchases. (Item 17).

Q. WHAT IS THE COMPANY'S RESPONSE TO THE SUGGESTION THAT IT CONSIDER AN OPTIMAL ECONOMIC BASED RESERVE MARGIN METHODOLOGY THAT CONSIDERS THE COST OF MEETING VARIOUS LEVELS OF RELIABILITY; PROVIDE A MORE COMPREHENSIVE LOLE ANALYSIS; AND ALSO CONSIDER TIE-LINE SUPPORT FROM NEIGHBORING UTILITIES (ITEM 5)?

A. Company witness Dr. Lynch addresses this issue in more detail. The Company is committed to discussing this suggestion with ORS and other parties. However, the Company will dispute any change in our reserve margin methodology that puts our customers at increased risk of outages based on economic analyses that are disconnected from the reality of our customers' lives and expectations. We are concerned about what is being suggested here. Our customers expect us to keep their lights on. That is particularly true on cold winter mornings when families are trying to get children to school and parents to work. Keeping the lights on is an obligation that the Company takes very seriously and will not willingly compromise in the interest of an economic model.

In keeping with the high value DESC places on providing reliable electricity supply to its firm customers, the Company assumes an acceptable supply risk measure of no more than one day with insufficient generation supply in ten years. It is undoubtedly less expensive to provide less reliable service, but a higher frequency of resource shortfalls will under no circumstances result only in

controlled events. The result of capacity shortfalls can be loss of control of the system with extensively disruptive impacts. Combining an extremely constrained gas transportation infrastructure with the movement toward more variable energy resources on the grid will create a future with higher and less well-known levels of risk. Weather volatility introduces high levels of uncertainty in the short term but will certainly result in extreme loads at some point in the long term.

Similarly, assuming that we can rely on our neighboring utilities to supply capacity shortfalls due to risky planning decisions is not responsible. This is exactly the wrong time in the evolution of the electric grid to extend risk.

Q. HOW DO YOU RESPOND TO ORS'S SUGGESTION THAT THE COMPANY SHOULD CONDUCT A DETAILED RETIREMENT STUDY FOR POTENTIAL EARLY RETIREMENT CANDIDATES INCLUDING THE WILLIAMS, WATEREE, URQUHART, AND MCMEEKIN COAL, GAS-FIRED STEAM TURBINE AND GAS-FIRED COMBUSTION TURBINE UNITS (Item 10)?

A. DESC plans to conduct detailed retirements studies for potential retirement candidates in the coming years. It will initially focus on the most likely candidates, which are Wateree, Urquhart 3 and McMeekin. Retirement studies are time consuming, resource intensive and expensive. They cannot all be done at once and will need to be sequenced and prioritized. The scope and order of studies on the

retirement study list could be altered annually depending upon progress on current studies and new information.

DESC does not consider its gas-fired combustion turbine units as candidates for early retirement generally but may replace certain aging ICT units with more modern, fuel-efficient units that have the fast-start capability required to support intermittent solar generation. This would not be a change to generation supply but an exchange and modernization of like-kind existing assets.

Q. WHY WERE EARLIER RETIREMENTS OF WATEREE AND WILLIAMS (PRE-2028) NOT MODELED?

Our experience is that without a significant change in regulation and/or a need to spend significant capital, our customers benefit from continuing to operate the generators that they are paying for and will continue to pay for after retirement. The last year coal plants can operate without addressing the ELG rule is 2028.

Q. PLEASE SUMMARIZE THE COMPANY'S PRIOR RETIREMENT OF COAL PLANTS.

Eight coal plants have been retired or converted to gas; only four coal plants remain. The status of all of the Company's current or former coal plants is summarized in Table C below.

Table C: Current Status of DESC Coal Plants

Coal Plant	Status
Canadys 1	Retired
Canadys 2	Retired
Canadys 3	Retired
McMeekin 1	Converted to gas only
McMeekin 2	Converted to gas only
Urquhart 1	Converted to gas only
Urquhart 2	Converted to gas only
Urquhart 3	Converted to gas only
Wateree 1	Coal
Wateree 2	Coal
Williams	Coal
Cope	Coal or gas

Q. DOES DESC INTEND TO STUDY COAL-FIRED GENERATION RETIREMENTS IN THE YEARS PRIOR TO 2028 WHICH IS THE YEAR THAT HE FIRST OF THESE RETIREMENTS WAS MODELED IN RP8 THE IRP?

A. Yes. The current analysis shows that maintaining the Williams and Wateree units in service is least cost and will remain so until some other resource becomes more cost-effective. Nonetheless, DESC plans to explore the potential for a coal plant retirement before 2028, but the optimization would likely result in a retirement coincident with ELG expenditures (2028), or possibly gas pipeline availability, de-escalating storage costs or some combination of these inputs if not all. A comprehensive study to determine retirement costs and impacts cannot be completed before work begins on the 2021 IRP update, which typically begins each

October, but studies based on estimates may be possible or included in the 2022 IRP update.

Q. SEVERAL PARTIES HAVE RAISED CONCERNS ABOUT THE COMPANY'S RESOURCE PLANNING APPROACH WHICH MODELS MULTIPLE GENERATION PLANS AGAINST MULTIPLE SETS OF SENSITIVITIES. THESE PARTIES ARGUE FOR THE USE OF RESOURCE OPTIMIZATION SOFTWARE, WHICH CREATES A SINGLE, OPTIMIZED RESOURCE PLAN FOR EACH SET OF SENSITIVITIES MODELED. PLEASE BRIEFLY SUMMARIZE HOW THE COMPANY DEVELOPED ITS EIGHT RESOURCE PLANS.

A. To create the eight resources plans modeled here, the Company identified the types of generation and technologies that are reasonably suitable for future addition to the system to meet customer demand. These generation resources and technologies were identified with the purpose of fairly evaluating the range of supply-side resources that are currently available to meet the utility's service obligations. These included battery storage, utility and third-party owned solar, and combined cycle ("CC") and internal combustion turbine ("ICT") resources. Reasonable scenarios for the early retirement of some generation facilities were also identified. These items were combined into eight potential resource plans. Next a set of low, medium and high demand side scenarios was identified that included customer energy efficiency and demand response. The base load forecast combined

with each of the three demand side management ("DSM") scenarios created three forecasts of summer and winter peaks. Using the peak forecasts, the eight groups of resources were configured and resource additions were scheduled to ensure that DESC could meet its reserve margin requirements in summer and winter of each year. These resulting schedules of resource additions produced the eight resource plans that were modeled. The resource additions were adjusted to meet the requirements of the three DSM scenario, resulting in 24 separate expansion plans, which are attached to the IRP Supplement as Appendix B.

These eight resource plans covered a wide range of options. Three different retirement plans were modeled. Four plans included additional renewables. All plans include 973 MW of existing solar PPAs. RP8 included 2100 MW of solar and 700 MW of storage. Three different size solar generators were modeled, 400, 100 and 50 MW. Two different types of solar generation were modeled, company-owned and PPA. Three different gas generators were modeled, CC, large-frame ICT, and aero-derivative ICT.

Q. WHAT IS THE COMPANY'S RESPONSE TO SUGGESTIONS IN THE ORS REPORT THAT THE COMPANY SHOULD PLACE A HIGH PRIORITY ON COMPLETING IMPLEMENTATION OF THE LEAST COST OPTIMIZATION MODEL PRIOR TO THE 2021 IRP UPDATE (Item 18)?

A. As of the date of this testimony, which is August of 2020, DESC is beginning the process of implementing a least cost optimization model to use in future IRPs.

The model is the PLEXOS LT – Capacity Expansion module, which is currently used across the Dominion Energy, Inc. footprint and so is available to DESC along with the possibility of accessing support and know-how from resource planning personnel at its sister utilities.

DESC intends to have that model fully configured and tested in time to support the 2021 IRP update. But it will be a complex process. The model includes hundreds of control inputs and thousands of data inputs. The model manages the inputs and outputs for multiple suites of third-party software and models that assist it in optimizing dozens of models and scenarios. DESC is placing a high priority on this configuration effort as ORS requests, but it could encounter problems and delays that make the 2021 goal impossible. Depending on how the implementation process progresses, during the fall of 2020 a decision will be made about relying on that model for the 2021 update.

Q. HOW DO YOU RESPOND TO THE SUGGESTION THAT THE COMPANY SHOULD EXPAND THE NUMBER OF RESOURCE PLANS EVALUATED FOR FUTURE IRPs AND DEVELOP ALTERNATIVE EXPANSION PLANS FOR DIFFERENT GAS PRICE AND CO_2 SENSITIVITIES IN FUTURE IRPs (Items 19 and 20)?

A. While the Company is willing to provide additional resource plans where it makes sense to do so, the first suggestion is not consistent with the nature of a resource optimization (CAPEX) model. Such a model does not evaluate resource

plans so much as it creates them. It produces a resource plan that is optimized for each scenario provided to it for evaluation. So unless a different outcome is forced, only one resource plan will be produced for each scenario and the number of resource plans will not be more than the number of scenarios modeled. In fact, the number may be less, since it is possible that a single resource plan can turn out to be the optimum resource plan under multiple scenarios. Moving to a resource optimization model will likely mean that fewer resource plans will be presented in future IRP filings, although those plans will be optimized to fit the scenarios modeled.

On the other hand, the resource optimization model will develop resource plans that are optimized for each gas price and CO_2 cost sensitivity provided to it as ORS requests. It will do so for every other combination of sensitivities as well.

Q. HOW DO YOU RESPOND TO THE SUGGESTION THAT THE COMPANY SHOULD CREATE A STAKEHOLDER PROCESS TO ASSIST IN THE FORMULATION OF FUTURE IRPs (Item 27)?

A. The Company fully supports creating a stakeholder process for use in preparing future IRPs and IRP updates. The Company is supportive of stakeholder involvement and will give consideration to all suggestions that are provided. However, the Company is responsible to its customers and the Commission for creating and implementing resource plans that provide for safe, reliable and affordable electric service to the public. Ultimately, the Company must endorse and

testify to the IRP plan it files and the scenarios it presents. The Company must take these facts into account in responding to stakeholder suggestions and retain appropriate control over the plans that are presented as part of its IRP planning process.

As a matter of schedule and timing, given the challenges of implementing the resource optimization model during the coming months, it may not be possible to implement a stakeholder process to support the 2021 IRP update. However, the 2020 IRP process has provided a high level of stakeholder review and input into the current model and the factors and assumptions contained in it. As indicated here, DESC will carry this information and input forward as it implements the new resource optimization model. However, it is not likely that preliminary results or other information from the new model will be available to support a meaningful stakeholder engagement process between the close of this proceeding and February of 2021 when the update must be filed. In order to be efficient with resources and all parties time, the process should be considered for the summer of 2021.

Q. HOW DO YOU RESPOND TO ORS'S SUGGESTION THAT THE COMPANY SHOULD DEVELOP A THREE-YEAR ACTION PLAN THAT IDENTIFIES ALL ACTIONS THE COMPANY INTENDS TO TAKE IN ORDER TO IMPLEMENT ITS IRP IN EACH FUTURE UPDATE AND COMPREHENSIVE IRP?

A. The Company believes this suggestion to be incompatible with the nature of an IRP. The IRP is a planning document. It sets forth the evaluation of alternative generation supply plans to identify which ones the Company should use as a reference in guiding future decision making. An IRP does not authorize the Company to take any action. Where new system supply resources are required, the decision to acquire them is subject to Commission review under the Utility Facility Siting and Environmental Compliance Act. In proceedings under that act, the Company presents planning studies specific to the resources in question and the alternatives available at that time to show that system need, reliability and economy are supported by the decision to acquire it. To treat the IRP as triggering a three-year action plan as to system supply would appear to be a distortion of the IRP's nature and purpose as a planning document not an action plan, and contrary to the regulatory structure in which it operates in South Carolina.

Q. HOW DO YOU RESPOND TO THE SUGGESTION THAT THE COMPANY SHOULD COMPLETE THE STUDIES TO ADDRESS THE CHANGES TO THE TRANSMISSION SYSTEM AND THE RELATED INVESTMENT INFRASTRUCTURE COSTS NECESSARY FOR NEW SOLAR RESOURCE ADDITIONS AND INCLUDE THAT INFORMATION AND A DESCRIPTION OF ITS STUDIES AND CONCLUSIONS IN THE NEXT COMPREHENSIVE IRP IN 2023 (Item 24)?

A. A statewide renewables integration study is being pursued by ORS. Any additional studies will need reference the results of the ORS study. In addition, the integration of intermitted solar resources into the system is as much a generation issue as a transmission issue, and treating it as a transmission issue is not appropriate.

Q. HOW DO YOU RESPOND TO THE SUGGESTION THAT THE COMPANY SHOULD SUPPLY ADDITIONAL INFORMATION ABOUT DISTRIBUTION RESOURCE PLANS AND INTEGRATED SYSTEM OPERATIONAL PLANS (Item 25)?

A. The Company's IRP guides its decision making regarding system-level resource planning issues. Distribution planning deals more with small area, localized planning and how to deliver power from the transmission grid to neighborhoods and local load centers. At present, distribution planning does not impact system-level resource planning in any meaningful way. DESC does not see the benefit of including distribution planning or operational information in its IRP. Doing so is not required under the IRP Statute.

RESPONSE TO THE ASSESSMENT OF IRP BY ORS

Q. HOW DO YOU RESPOND TO THE OVERALL ASSESSMENT BY ORS OF THE DESC 2020 IRP?

A. ORS Witness Anthony Sandonato, at page 4 of his prefiled direct testimony, testifies that, "[t]he Company's IRP as filed with the Commission includes the

elements required under the Act . . . ." A similar finding is repeated ten times as to specific elements of the IRP.[2] This finding is consistent with the overall conclusions of the independent review conducted by Charles River Associates ("CRA"), which was attached to my direct testimony as Exhibit No.__ (EHB-2).

Nevertheless, the ORS Report was unable to verify compliance with the requirements of S.C. Code Ann. § 58-37-40 (the "IRP statute") due to concerns about the repair or replace studies related to the Wateree Units and the items that ORS asserted needed to be changed or corrected in the study as files. Both of those matters have been addressed in this filing.

Q. IS SCSBA'S WITNESS SERCY'S CRITICISM OF THE CRA REPORT FAIR?

A. No. Witness Sercy questions the independence of the CRA report, which concluded that DESC IRP planning methodologies and reserve margin policies were reasonable and appropriate. He asserts those findings were not independent. That is not the case. As required by the settlement agreement with the SCSBA in the recent merger docket, CRA independently audited and reviewed DESC's methodologies to ensure that the Company's IRP methodologies were in line with industry standards. The CRA Report also offers suggestions for improvement in certain areas, but clearly found that DESC's planning methodologies and reserve

[2] *See* ORS Report at pp. 13-16.

margin policies were consistent with industry standards and reasonable. As required under the settlement agreement with the SCSBA in the Dominion Energy merger proceeding, the scope and nature of that work was defined jointly with the SCSBA and CRA was identified by SCSBA as a suitable consulting firm to conduct the study. It is important to also note that Charles River Associates was jointly selected by the Company and SCSBA to conduct the independent review at the onset of the effort. CRA performed that study independently and professionally as was expected.

Q. IN THE ORS REPORT, ORS SUGGESTS THAT THE COMPANY'S REQUEST FOR APPROVAL IS NOT ALIGNED WITH THE IRP STATUTE, HOW DO YOU RESPOND?

A. I do not believe that this is a fair criticism. DESC is asking the Commission to approve the DESC 2020 IRP along with the IRP Supplement under the terms of the IRP statute. Pages 29 and 30 of my Direct Testimony states specifically that:

> The modeling done in support of this 2020 IRP shows that, from the customer affordability and least cost standpoint, Resource Plan 2 is the plan that is most beneficial to customers under current conditions. But Resource Plan 8 would likely be the most resilient in the face of increasing environmental limitations on CO_2 discharges and on coal-fired generation. As discussed above, DESC is not facing any decision points in the near term that will require a choice to be made between the eight resource plans that have been modeled in the 2020 IRP. Accordingly, DESC is presenting all eight resource plans as a range of possible approaches to meeting its customers' future capacity needs and will rely on Resource Plan 2 for avoided cost determinations until a new plan is prepared.

This is still the case. Omitted from page 11 of the ORS Report's characterization is the requirement that the Commission "shall consider whether the plan *appropriately balances*" the enumerated factors. S.C. Code Ann. § 58-37-40 (emphasis added). We believe that this plan does.

To the extent that any further clarity is required, RP2 is the preferred plan because from the customer affordability and least cost standpoint it is the plan that is most beneficial to customers under current conditions. However, the Company recognizes that other plans like RP8 may become the preferred plan as conditions evolve. RP8 has the advantage of limiting CO_2 emissions far more than any alternative and its costs are comparative to other plans where CO_2 costs are imposed. These multiple plans provide the balance that the IRP statute envisions.

Q. WHY IS DESC PRESENTING BOTH A BASE AND LOW CARBON PLAN IN ITS IRP?

A. The base plan presented, RP2, is the plan the Company will use as a reference plan until conditions indicate otherwise. This plan does not contemplate the early retirement of any existing coal generation plants and meets future load growth with gas-fired generation, principally large frame ICTs. However, the Company recognizes the growing expectation that utilities should reduce their future carbon emissions and also presents RP8, the low carbon plan. This plan assumes the early retirement of DESC's largest coal-fired units, Wateree and Williams, and replaces them with solar generation and battery storage with fast-start gas-fired generation

to provide reliability and deal with solar intermittency. Although the modeling shows RP8 to be more expensive for customers under several scenarios assumptions, where significant CO_2 costs are assumed the price differential between this resource plan and its competitors is quite small.

CONCLUSIONS

Q. WHAT DO YOU ASK THE COMMISSION TO DO BASED ON YOUR REBUTTAL TESTIMONY?

A. As my testimony shows, the Company has responded in a thorough and responsible way to the issues raised in the testimony of ORS, in the ORS Report, and, where valid issues were raised, the other parties. The Company thanks ORS and the other parties for the contribution they have made through their analyses and suggestions to improving the 2020 IRP and future IRPS.

The IRP Supplement and the analyses underlying it establish that the initial conclusions of the 2020 IRP remain valid. Including the changes and revisions proposed by the parties, principally ORS and the ORS Report, the IRP's outcome does not change. RP2 remains the lowest cost plan for customers under the Reference Scenario and other scenarios that do not include a $25/ton CO_2 cost. RP8 represents the plan with the greatest impact on CO_2 emission and is roughly equivalent in cost to the alternatives resource plans where CO_2 costs are considered.

The Company will be substantially revamping its IRP planning process going forward with the implementation of a resource optimization model which it intends

to have in place by the 2021 IRP update. The Company has committed to make additional changes in its IRP planning in response to ORS requests as outlined above. Based on these facts, the Company respectfully requests the Commission to approve DESC's 2020 IRP including the IRP Supplement so that it may fully focus on the important items in the 2021 IRP update.

Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A. Yes.

Restated and Supplemented Version of Chapter II.B.5 of the Dominion Energy South Carolina, Inc. 2020 IRP

II.B.5. Resource Plan Analysis

a. Overview

The Company received a number of recommendations after filing its 2020 IRP Resource Plan Analysis. The following pages provide results from the modified resource plan analysis which include almost all of the ORS's changes labeled "N" for now in the ORS Report. This exhibit is a revision to the DESC 2020 IRP Section II.B.5 – Resource Plan Analysis ("Section II.B.5"), and the updated DESC 2020 IRP together with the updated Section II.B.5 will be the Modified DESC 2020 IRP. The details of the modifications are documented in the rebuttal testimony of James Neely and Eric Bell.

The following pages document a resource planning study that was performed to assess the ability of multiple resource plans to meet customers' need for power while responding to varying future market conditions and regulations. Included in the Company's study were eight resource plans and three sets of DSM scenarios. In the original 2020 IRP, the eight resource plans were studied using the three natural gas prices and two CO_2 cost scenarios using only the Medium DSM case. In this Modified DESC 2020 IRP, the eight plans were also evaluated under the three levels of natural gas prices and the two CO_2 emission cost prices and all three DSM cases. The Company's base forecast of energy and demands was used as a starting point in developing the DSM scenario loads. The Load Forecast (discussed in Part I of the 2020 IRP) is called the Medium DSM case. Medium DSM is based on the expected program levels identified in the 2019 Potential Study and are the programs the Company plans to deploy. By modifying the Load Forecast with other levels of DSM, Low and High DSM sensitivities are included in the Resource Plan Analysis. The low DSM is equivalent to DSM programs and levels on the DESC electric system prior to the 2019 Potential Study. The 2019 Potential Study level is called Medium DSM, and a 1.0% level of DSM is called the High DSM case. The DSM Low and Medium cases were studied for cost-effectiveness and provide a reliable cost estimate that is unique to the portfolio of programs and customers in DESC's

electric system. The High DSM case was not supported in the 2019 Potential Study and is based on estimates.

Resource plans were created around retirements, environmental regulations and additional renewable resources. These scenarios create a large array of output data. The following pages include several displays of the high-level output data meant to emphasize the most relevant results.

b. Reserve Margin

DESC's reserve margin policy is summarized in the following table. Peaking reserves are considered the capacity needed during the five highest peak load days in the season while base reserves are needed for the balance of the season.

DESC's Reserve Margin Policy		
	Summer	**Winter**
Base Reserves	12%	14%
Peaking Reserves	14%	21%
Increment for Peaking	2%	7%

Statements about reserve margin are generally addressing Base Reserve criteria.

c. Meeting the Base Resource Need

In the context of base or peaking, base resources are the resources explicitly identified in a resource plan's 40-year schedule to meet the summer or winter ***base*** reserve margin. Peaking reserve margin assists in quantifying reliability risk but is not used for deciding on base capacity resources as distinct from more time-limited peaking resources. For base resources the winter base reserve margin of 14% was used to determine the timing of adding generation resources. DESC created a list of six generating resources to be considered. The following table lists these resources. Wateree and Williams Stations are assumed retired when they reach their end of life, which is years 2044 and 2047 respectively, if not retired earlier. The capital costs are escalated or de-escalated from 2020 to the year that the generator is installed. The installation year varies by resource plan and the DSM scenario load levels as different loads impact the reserve margin. The capacity used in the resource plan schedule for CC and ICT resources is their winter capacity.

Description of Potential Resources

Resource	Capital Cost 2020 $/kW	Escalation Rate	Capacity	Source of Data
Battery Storage	$1,349	-2.11% (2020-2030) -0.617% (2031-2049)	100 MW with 4 hour duration	• NREL 2020 nominal • CAPEX Escalation is from NREL Mid Technology Cost Scenario nominal forecast of CAPEX
Solar	$1,151	0.262% (2020-2030) 0.756% (2031-2049)	50, 100 or 400 MW	• Dominion Energy Services - Generation Construction Financial Management & Controls • CAPEX Escalation is from NREL Mid Technology Cost Scenario nominal forecast of CAPEX
CC 1-on-1	$1,406	3.75%	553 MW	• Dominion Energy Services - Generation Construction Financial Management & Controls • CAPEX Escalation is from Handy Whitman July 2019 15 year Average – Total Plant
ICT Large Frame (2x)	$496	3.75%	523 MW	• Dominion Energy Services - Generation Construction Financial Management & Controls • CAPEX Escalation is from Handy Whitman July 2019 15 year Average – Total Plant
ICT Aero (2x)	$970	3.75%	131 MW	• Dominion Energy Services - Generation Construction Financial Management & Controls • CAPEX Escalation is from Handy Whitman July 2019 15 year Average – Total Plant
Solar PPA	N/A	N/A	400 MW	• NREL 2019, Mid Technology Cost Scenario

i. Resource Plans

A collection of generation resources and technologies was identified with the purpose of fairly evaluating a range of supply-side resources that are currently available to meet the utility's service obligations. These included storage, utility and third-party owned solar, and CC and ICT gas turbine resources. Reasonable scenarios for the early retirement of some generation facilities were also identified. These resources and assumptions concerning facility retirements were combined into eight potential resource plans.

Next a set of low, medium and high demand side scenarios was identified that included customer energy efficiency and demand response. The base load forecast combined with each of the three demand side management ("DSM") scenarios created three forecasts of summer and winter peaks. Using the peak forecasts, the eight groups of resources were configured and resource additions were scheduled to ensure that DESC could meet its reserve margin requirements in summer and winter of each year. The scheduling of resource additions was determined by capacity needs on the system as they evolved. These resulting schedules of resource additions produced the eight resource plans that were modeled. These eight resource plans cover a wide range of possible resource portfolios. Three plans include three different retirement assumptions. Four plans include various levels of renewables with RP8 adding 2100 MW of solar and 700 MW of battery storage. All plans include 973 MW of existing solar PPAs. Three different size solar generators were modeled at 400 MW, 100 MW and 50 MW. Three different types of gas resources are modeled: CC, Frame ICT, and Aero ICT. Two different types of solar generation were modeled, company-owned and third party owned PPAs.

All plans are designed with reliability in mind. The eight resource plans are listed in the following table which is followed by a description of each resource plan.

Description of Resource Plans

Resource Plan ID	Resource Plan Name	Resource Plan Description
RP1	CC	Combined Cycle, ICTs
RP2	ICT	ICTs
RP3	Retire Wateree	Wateree 1 & 2 retirement, Combined Cycle, ICTs
RP4	Retire McMeekin	McMeekin and Urquhart 3 retirement, ICTs
RP5	Solar + Storage	Flexible Solar + Battery Storage, Combined Cycle, ICTs
RP6	Solar	Flexible Solar, ICTs
RP7	Solar PPA + Storage	Flexible Solar PPA + Battery Storage, ICTs
RP8	Retire Coal	Wateree and Williams retirements with Combined Cycle, Solar and Battery Storage, ICTs

Flexible solar is a solar facility which can be curtailed when systems conditions require and/or dispatched with system needs.

Resource Plan 1: In this resource plan a 553 MW (winter capacity) combined cycle gas generator is added when the winter reserve margin drops below 14%. 523 MW blocks of ICTs are added to maintain the 14% winter reserve margin during the modeling period.

Resource Plan 2: In this resource plan 523 MW (winter capacity) of ICT gas generators are added when the winter reserve margin drops below 14% during the modeling period.

Resource Plan 3: In this resource plan Wateree units 1 and 2 are retired in 2028 and a combined cycle gas generator is added in 2028. Five hundred twenty-three (523) MW blocks of ICTs are added to maintain the 14% winter reserve margin during the modeling period.

Resource Plan 4: In this resource plan McMeekin 1 and 2 along with Urquhart 3 are retired in 2028. Their 346 MW of capacity are replaced by 523 MW of ICT capacity. Five hundred twenty-three (523) MW blocks of ICTs are added to maintain the 14% winter reserve margin during the modeling period.

Resource Plan 5: In this resource plan 400 MW of Company owned flexible solar generation plus 100 MW of battery storage are added in 2026. The next increment of capacity necessary to maintain a 14% winter reserve margin is a 553 MW combined cycle gas generator. After the CC, 523 MW blocks of ICTs are added to maintain the 14% winter reserve margin during the modeling period.

Resource Plan 6: In this resource plan 400 MW of Company owned flexible solar generation is added in 2026. Five hundred twenty-three (523) MW blocks of ICTs are added to maintain the 14% winter reserve margin during the modeling period.

Resource Plan 7: In this resource plan 400 MW of flexible solar PPA generation plus 100 MW of battery storage are added in 2026. Five hundred twenty-three (523) MW blocks of ICTs are added to maintain the 14% winter reserve margin during the modeling period.

Resource Plan 8: In this resource plan Wateree and Williams are retired in 2028 and replaced with a 553 MW 1-on-1 combined cycle plant and Five hundred twenty-three (523) MW of ICTs. Dual fuel capability is eliminated at Cope, so Cope burns only natural gas starting in 2030. Additional tranches of 100 MW of battery storage and 131 MW ICTs are added to maintain the 14% winter reserve margin during the modeling period. Solar is added in 2026, 2027 and each year from 2029 to 2048. In this plan 2100 MW of solar are added with 500 MW to 900 MW of storage. This resource plan is the low carbon plan.

The timing and nature of resource additions and the resulting capacities and reserve margins for each of the 30 years of the model horizon are set forth in the tables attached as **Appendix B** to this document. Please note that winter and summer net dependable capacities are different for most resources and nameplate capacity and net dependable capacity will be different, particularly for solar capacity additions. The capacity of each addition is reflected initially against winter peak and discounted or increased as appropriate for summer peak.

ii. Methodology

The incremental revenue requirements associated with each of the eight resource plans was computed using the PROSYM computer program to estimate production costs and an EXCEL revenue requirements model to calculate the associated capital costs. The EXCEL revenue requirements model combines the capital costs, DSM costs and production costs to estimate total incremental revenue requirements over a 40-year planning horizon.

iii. Demand Side Management Assumptions

Three DSM cases were created. The low DSM is equivalent to DSM programs and levels on the DESC electric system prior to the 2019 Potential Study. The medium DSM used the results of the 2019 Potential Study described in Part II.A. High DSM assumed DSM

Growth to 1% of retail sales by 2024. It should be noted that the High DSM case was not supported in the 2019 Potential Study, is based only on estimates which are not likely to be achievable with the conditions as studied in the 2019 Potential Study, and the cost effectiveness of this case is unknown.

The three DSM cases created three demand and energy forecasts. A low level of DSM creates higher demands and energy. A high level of DSM creates demands and energies that are lower. The cost for each DSM case was calculated over a 40-year period and applied to the appropriate scenario. Assuming no baseload retirements, the first need for additional capacity occurs in the winter of 2035 when using the Medium DSM demands, in 2032 when using the Low DSM demands and 2038 when using the High DSM demands.

The use of the Low, Medium and High DSM demands result in scenarios that measure the sensitivity of the resource plans to variations in future load growth. The Low, Medium and High economic load growth sensitivities are also a measure of potential variation in future load growth and are in part duplicative of the DSM sensitivities. The economic load growth sensitivities were not modeled to limit the scenarios to a manageable number (144 scenarios as presently modeled compared to 432 with DSM and the Low, Medium and High economic load growth sensitives modeled). If all eighteen economic load growth sensitivity combinations were modeled (*i.e.,* low, medium, high load growth, as well as wholesale and electric vehicle sensitives), the number of scenarios presented would be 2,592 scenarios, which is not practical. The three DSM cases provide a range of load growth assumptions that are sufficient in the Company's opinion to assess the sensitivity of the resource plans to load growth variations.

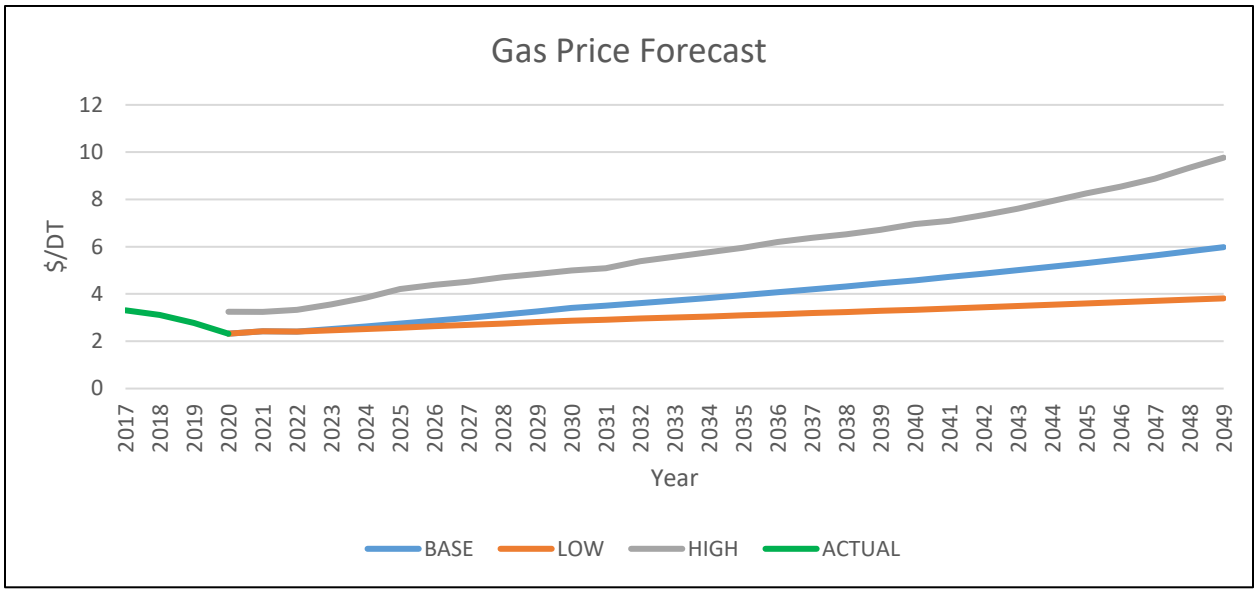
iv. Emissions, DSM and Fuel Sensitivity

The DSM cases were evaluated using three gas price assumption plus two CO_2 cost assumptions. The combination of the three DSM assumptions, three gas price assumptions and two CO_2 cost assumptions created 18 different sensitivities. The eight resource plans times the 18 sensitivities equal 144 different scenarios.

The chart below shows the three gas price forecasts used. The high gas price forecast is the 2019 EIA gas price forecast. The base gas and low gas scenarios are based on NYMEX gas prices for years 2020-2022, then escalated at two different rates. The base escalation rate is derived from the EIA gas price forecast. The low gas scenario escalation rate is half of the

base gas escalation rate. The two CO_2 assumptions used were $0/ton and $25/ton. All plans include assumptions about expenses that will be required to meet ELGs for Wateree and Williams.

Low, Base and High Gas Price Forecast



v. Resource Plan Rankings by DSM, Gas Price and CO_2 Price

The following tables summarize the 40-year levelized (annual) NPV cost results for all eight resource plans under the three different DSM scenarios, three different gas price cases and two different CO_2 price cases. (1 - Green= Least cost, 2 – Blue = Second Lowest and 8 - Orange = Highest cost)

Resource Plan Levelized NPV Rankings for Medium DSM

RP ID	Resource Plan Name	$0/ton CO_2	$0/ton CO_2	$0/ton CO_2	$25/ton CO_2	$25/ton CO_2	$25/ton CO_2
(082120)		Low Gas	Base Gas	High Gas	Low Gas	Base Gas	High Gas
RP1	CC	4	4	4	5	4	4
RP2	ICT	1	1	1	4	5	3
RP3	Retire Wateree	2	3	6	2	1	2
RP4	Retire McMeekin	5	5	3	6	6	6
RP5	Solar + Storage	7	7	7	8	8	8
RP6	Solar	6	6	5	7	7	5
RP7	Solar PPA + Storage	3	2	2	3	3	1
RP8	Retire Coal	8	8	8	1	2	7

Resource Plan Levelized NPV for Medium DSM ($000)

RP ID	Resource Plan Name	$0/ton CO_2	$0/ton CO_2	$0/ton CO_2	$25/ton CO_2	$25/ton CO_2	$25/ton CO_2
(082120)		Low Gas	Base Gas	High Gas	Low Gas	Base Gas	High Gas
RP1	CC	1,397,881	1,470,469	1,622,415	1,619,829	1,693,271	1,870,416
RP2	ICT	1,389,066	1,461,624	1,612,190	1,618,734	1,693,466	1,868,087
RP3	Retire Wateree	1,391,707	1,467,950	1,634,829	1,602,660	1,679,692	1,863,611
RP4	Retire McMeekin	1,400,022	1,470,534	1,621,990	1,630,314	1,704,266	1,879,853
RP5	Solar + Storage	1,426,530	1,496,382	1,643,927	1,641,254	1,711,419	1,884,746
RP6	Solar	1,413,238	1,483,088	1,629,308	1,633,673	1,705,055	1,877,619
RP7	Solar PPA + Storage	1,397,653	1,467,541	1,613,882	1,617,654	1,689,211	1,862,973
RP8	Retire Coal	1,427,213	1,508,126	1,700,900	1,601,430	1,680,729	1,880,379

Resource Plan Levelized NPV Rankings for Low DSM

	Resource Plan Name	$0/ton CO_2	$0/ton CO_2	$0/ton CO_2	$25/ton CO_2	$25/ton CO_2	$25/ton CO_2
(082120)		Low Gas	Base Gas	High Gas	Low Gas	Base Gas	High Gas
RP1	CC	4	4	3	4	5	4
RP2	ICT	1	1	1	3	3	3
RP3	Retire Wateree	2	2	5	1	1	1
RP4	Retire McMeekin	6	6	6	8	8	8
RP5	Solar + Storage	7	7	7	7	7	6
RP6	Solar	5	5	4	6	6	5
RP7	Solar PPA + Storage	3	3	2	5	4	2
RP8	Retire Coal	8	8	8	2	2	7

Resource Plan Levelized NPV for Low DSM ($000)

RP ID	Resource Plan Name	$0/ton CO_2	$0/ton CO_2	$0/ton CO_2	$25/ton CO_2	$25/ton CO_2	$25/ton CO_2
(082120)		Low Gas	Base Gas	High Gas	Low Gas	Base Gas	High Gas
RP1	CC	1,403,707	1,478,216	1,634,876	1,628,694	1,705,402	1,887,412
RP2	ICT	1,390,508	1,464,172	1,618,356	1,624,249	1,701,205	1,881,921
RP3	Retire Wateree	1,390,784	1,468,308	1,639,268	1,606,791	1,685,469	1,873,937
RP4	Retire McMeekin	1,415,912	1,487,174	1,640,400	1,651,214	1,727,339	1,902,263
RP5	Solar + Storage	1,429,636	1,500,544	1,650,943	1,647,671	1,720,163	1,895,594
RP6	Solar	1,413,589	1,486,136	1,635,641	1,638,858	1,713,899	1,890,321
RP7	Solar PPA + Storage	1,403,663	1,474,717	1,623,625	1,629,328	1,702,969	1,877,627
RP8	Retire Coal	1,437,520	1,519,550	1,716,437	1,616,809	1,697,297	1,901,681

Resource Plan Levelized NPV Rankings for High DSM

	Resource Plan Name	$0/ton CO_2	$0/ton CO_2	$0/ton CO_2	$25/ton CO_2	$25/ton CO_2	$25/ton CO_2
(082120)		Low Gas	Base Gas	High Gas	Low Gas	Base Gas	High Gas
RP1	CC	3	3	3	4	4	4
RP2	ICT	1	1	1	3	3	3
RP3	Retire Wateree	2	2	5	1	1	1
RP4	Retire McMeekin	6	6	6	8	8	8
RP5	Solar + Storage	7	7	7	7	7	7
RP6	Solar	5	5	4	6	6	5
RP7	Solar PPA + Storage	4	4	2	5	5	2
RP8	Retire Coal	8	8	8	2	2	6

Resource Plan Levelized NPV for High DSM ($000)

	Resource Plan Name	$0/ton CO_2	$0/ton CO_2	$0/ton CO_2	$25/ton CO_2	$25/ton CO_2	$25/ton CO_2
(082120)		Low Gas	Base Gas	High Gas	Low Gas	Base Gas	High Gas
RP1	CC	1,388,402	1,458,548	1,607,686	1,605,346	1,676,376	1,851,247
RP2	ICT	1,379,551	1,450,487	1,598,935	1,602,038	1,674,410	1,849,748
RP3	Retire Wateree	1,382,137	1,455,818	1,619,997	1,587,640	1,661,713	1,843,850
RP4	Retire McMeekin	1,405,684	1,473,978	1,620,727	1,628,987	1,699,312	1,869,729
RP5	Solar + Storage	1,418,921	1,486,602	1,629,465	1,627,946	1,696,393	1,865,749
RP6	Solar	1,404,063	1,472,422	1,615,795	1,617,921	1,687,168	1,858,512
RP7	Solar PPA + Storage	1,394,497	1,462,047	1,604,954	1,608,252	1,677,727	1,847,434
RP8	Retire Coal	1,421,639	1,500,477	1,688,667	1,591,521	1,669,144	1,863,823

vi. Discussion of Scenario Costs Results

The following table calculates the average ranking for all resource plans under each sensitivity as well as all sensitivities. When all sensitivities are considered, RP2 is the least cost. RP2 is also lower cost when CO_2 is assumed to be $0/ton and this resource plan fares well under all sensitivities. RP7 is least cost when all Medium DSM sensitivities are considered or when all high gas sensitivities are considered. RP3 is lower cost when CO_2 is assumed to be $25/ton. RP4 includes retirements of McMeekin and Urquhart 3 in 2028 and has higher carbon production and high total costs when CO_2 is $25/ton. The coal retirement cases, RP3 and RP8, fare better when under the $25/ton CO_2 case. RP1, RP3, RP5 and RP8 add combined cycle generation and are generally more expensive when CO_2 costs are zero. RP8 retires all coal generating capacity by 2030 and is consistently one of the most expensive plans. Since RP2 is the least cost alternative under zero cost CO_2, Base Gas, and Medium DSM, it is considered the base case, but it is also the least cost plan under Low and High DSM cases when CO_2 is $0/ton. Under new regulations or changes in the market, however, the base case may change. Given societal trends that are requiring more sustainable sources of clean energy, RP5, RP6, RP7 and RP8 have significant merits with their addition of renewables. The Company will continue to study the cost and benefit of portfolio alternatives that lower CO_2 emissions and promote more sources of clean energy.

Average Resource Plan Levelized NPV Rankings

(082120)	Resource Plan Name	All Sensitivities	$0/ton CO_2	$25/ton CO_2,	Low DSM	Med DSM	High DSM	Low Gas	Base Gas	High Gas
RP1	CC	3.89	3.56	4.22	4.00	4.17	3.50	4.00	4.00	3.67
RP2	ICT	2.17	1.00	3.33	2.00	2.50	2.00	2.17	2.33	2.00
RP3	Retire Wateree	2.22	3.22	1.22	2.00	2.67	2.00	1.67	1.67	3.33
RP4	Retire McMeekin	6.39	5.44	7.33	7.00	5.17	7.00	6.50	6.50	6.17
RP5	Solar + Storage	7.11	7.00	7.22	6.83	7.50	7.00	7.17	7.17	7.00
RP6	Solar	5.44	5.00	5.89	5.17	6.00	5.17	5.83	5.83	4.67
RP7	Solar PPA + Storage	3.06	2.78	3.33	3.17	2.33	3.67	3.83	3.50	1.83
RP8	Retire Coal	5.72	8.00	3.44	5.83	5.67	5.67	4.83	5.00	7.33

vii. Resource Plan Rankings by Total Fuel Costs

The following table summarizes the 40 year levelized NPV total fuel cost rankings for all eight resource plans under the three different gas price cases and two different CO_2 price cases. Only the Medium DSM case results are shown, but the results look very similar for all levels of DSM modeled.

Resource Plan Rankings by Total Fuel Costs for Medium DSM

(080720)	Resource Plan Name	$0/ton CO_2	$0/ton CO_2	$0/ton CO_2	$25/ton CO_2	$25/ton CO_2	$25/ton CO_2
		Low Gas	Base Gas	High Gas	Low Gas	Base Gas	High Gas
RP1	CC	3	4	4	4	4	4
RP2	ICT	7	7	7	7	7	7
RP3	Retire Wateree	4	5	6	3	5	6
RP4	Retire McMeekin	8	8	8	8	8	8
RP5	Solar + Storage	2	2	1	2	2	1
RP6	Solar	6	6	5	6	6	5
RP7	Solar PPA + Storage	5	3	2	5	3	3
RP8	Retire Coal	1	1	3	1	1	2

viii. Discussion of Resource Plan Fuel Costs Results

One observation is how consistently each resource plan ranks if total fuel costs alone were considered. Frequently RP5 and RP8 have the lowest total fuel costs. These two resource plans add a combined cycle gas generator with its additional fixed gas transportation costs but frequently have the lowest total fuel costs. RP4, which retires McMeekin 1 and 2 and Urquhart 3 and meets the reserve margin with ICTs, is consistently the most expensive.

ix. Resource Plan Rankings by 2030 CO_2 Emissions

The following tables summarize the CO_2 emissions results for all eight resource plans under the three different gas price cases and two different CO_2 price cases. Only the Medium DSM case results are shown, but the rankings are similar for all levels of DSM modeled. Note that in some cases, certain plans are tied, and the rankings reflect the ties.

Resource Plan Rankings by CO_2 for Medium DSM

	Resource Plan Name	$0/ton CO2	$0/ton CO2	$0/ton CO2	$25/ton CO2	$25/ton CO2	$25/ton CO2
(80720)		Low Gas	Base Gas	High Gas	Low Gas	Base Gas	High Gas
RP1	CC	7	7	7	7	7	7
RP2	ICT	7	7	7	7	7	7
RP3	Retire Wateree	2	2	2	2	2	2
RP4	Retire McMeekin	6	6	6	6	6	6
RP5	Solar + Storage	4	3	3	4	4	4
RP6	Solar	3	5	5	3	3	3
RP7	Solar PPA + Storage	4	3	3	4	4	4
RP8	Retire Coal	1	1	1	1	1	1

Resource Plan 2030 CO_2 for Medium DSM (K Tons)

	Resource Plan Name	$0/ton CO2	$0/ton CO2	$0/ton CO2	$25/ton CO2	$25/ton CO2	$25/ton CO2
		Low Gas	Base Gas	High Gas	Low Gas	Base Gas	High Gas
RP1	CC	11,195	11,419	13,263	10,944	11,035	11,595
RP2	ICT	11,195	11,419	13,263	10,944	11,035	11,595
RP3	Retire Wateree	10,135	10,180	11,010	9,962	9,979	10,268
RP4	Retire McMeekin	11,150	11,349	13,181	10,792	10,791	11,417
RP5	Solar + Storage	10,870	11,056	12,893	10,562	10,613	11,230
RP6	Solar	10,858	11,087	12,950	10,498	10,559	11,217
RP7	Solar PPA + Storage	10,870	11,056	12,893	10,562	10,613	11,230
RP8	Retire Coal	7,747	7,733	7,727	7,712	7,700	7,680

x. Discussion of CO_2 Results by Resource Plan

Under all scenarios the 2030 CO_2 is lowest in RP8 which includes the retirement of all coal generation by 2030 and the addition of a new efficient combined cycle, combustion turbines, and batteries. The second lowest 2030 CO_2 occurs in RP3 which retires Wateree in 2028. The lowest value in the table is 7,680 K Tons which is a 59% reduction of CO_2 emission from year 2005. This shows that a significant reduction in CO_2 can be achieved.

The $25/ton CO_2 adder had the biggest impact when coupled with high gas prices, about a 10% reduction. RP4 includes a retirement of all gas steam plants and doesn't make a significant reduction to total CO_2 emissions. Also, RP1 with a combined cycle plant, RP2 with combustion turbines, and RP4 that retires three gas fired boilers have the highest CO_2 emission in 2030 and do not achieve CO_2 reduction goals.

xi. Forecast of Renewable Generation

All resource plans include a significant amount of renewables, between 8% and 21% of total generation. The values in the table are the total renewable generation by resource plan, by 10-year period for the Medium DSM, Base Gas, and \$0/ton CO_2 scenarios only.

Energy from Renewable Generation by Decade (GWh)

Resource Plan ID	Resource Plan Name	2020-2029	2030-2039	2040-2049
RP1	CC	19,912	20,338	20,339
RP2	ICT	19,912	20,338	20,339
RP3	Retire Wateree	19,912	20,338	20,339
RP4	Retire McMeekin	19,912	20,338	20,339
RP5	Solar + Storage	22,571	28,744	28,432
RP6	Solar	22,180	27,942	28,315
RP7	Solar PPA + Storage	22,571	28,721	28,473
RP8	Retire Coal	20,429	35,322	56,159

The following resource plan is the least cost resource plan.

Resource Plan 2

DESC Forecast of Summer and Winter Loads and Resources - 2020 IRP

(MW)

		YEAR	2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030		2031		2032		2033		2034	
			S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W
Load Forecast																																
1		Baseline Trend	4816	4891	4847	4948	4903	5003	4955	5037	4992	5089	5043	5143	5095	5197	5148	5249	5202	5301	5252	5351	5301	5408	5357	5465	5412	5518	5467	5574	5520	5627
2		EE Impact	0	0	0	-24	-24	-48	-50	-73	-76	-97	-102	-121	-128	-147	-155	-172	-183	-199	-211	-199	-211	-199	-211	-199	-211	-199	-211	-199	-211	-199
3		Gross Territorial Peak	4816	4891	4847	4924	4879	4955	4905	4964	4916	4992	4941	5022	4967	5050	4993	5077	5019	5102	5041	5152	5090	5209	5146	5266	5201	5319	5256	5375	5309	5428
System Capacity																																
4		Existing	5689	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915
5		Existing Solar	263	0	329	0	448	0	448	0	448	0	448	0	448	0	448	0	448	0	448	0	448	0	448	0	448	0	448	0	448	0
6		Demand Response	227	224	228	226	229	228	230	230	231	234	232	239	233	249	234	261	235	275	236	276	237	277	238	278	239	279	240	280	241	281
		Additions:																														
7		Solar Plant	67	0	118	0																										
8		Peaking/Intermediate																														
9		Baseload																														
10		Retirements	-25																													
11		Total System Capacity	6220	6139	6340	6141	6341	6143	6342	6145	6343	6149	6344	6154	6345	6164	6346	6176	6347	6190	6348	6191	6349	6192	6350	6193	6351	6194	6352	6195	6353	6196
12																																
13		Total Production Capability	6220	6139	6340	6141	6341	6143	6342	6145	6343	6149	6344	6154	6345	6164	6346	6176	6347	6190	6348	6191	6349	6192	6350	6193	6351	6194	6352	6195	6353	6196
Reserves																																
14		Margin (L13-L3)	1404	1248	1493	1217	1462	1188	1436	1182	1426	1157	1403	1133	1378	1113	1353	1100	1327	1089	1306	1040	1258	983.7	1203	927.7	1149	875.7	1095	820.7	1043	768.7
15		% Reserve Margin (L14/L3)	29.2%	25.5%	30.8%	24.7%	30.0%	24.0%	29.3%	23.8%	29.0%	23.2%	28.4%	22.6%	27.7%	22.0%	27.1%	21.7%	26.4%	21.3%	25.9%	20.2%	24.7%	18.9%	23.4%	17.6%	22.1%	16.5%	20.8%	15.3%	19.7%	14.2%

New resources are added to meet either a 12% summer reserve margin or a 14% winter reserve margin. Because of the higher loads in the winter and 972 MW of solar that contribute some capacity to the summer reserves but not in the winter, the need for winter reserves drives the need to add new capacity. Even then, with just a 0.7% peak load growth rate, no new resources are added until 2035, which is outside the fifteen-year window shown above.

The following plan has the lowest CO2.

Resource Plan 8

DESC Forecast of Summer and Winter Loads and Resources - 2020 IRP Update

(MW)

	YEAR	2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030		2031		2032		2033		2034	
		S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W
Load Forecast																															
1	Baseline Trend	4816	4891	4847	4948	4903	5003	4955	5037	4992	5089	5043	5143	5095	5197	5148	5249	5202	5301	5252	5351	5301	5408	5357	5465	5412	5518	5467	5574	5520	5628
2	EE Impact	0	0	0	-24	-24	-48	-50	-73	-76	-97	-102	-121	-128	-147	-155	-172	-183	-199	-211	-199	-211	-199	-211	-199	-211	-199	-211	-199	-211	-199
3	Gross Territorial Peak	4816	4891	4847	4924	4879	4955	4905	4964	4916	4992	4941	5022	4967	5050	4993	5077	5019	5102	5041	5152	5090	5209	5146	5266	5201	5319	5256	5375	5309	5429
System Capacity																															
4	Existing	5689	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915	5664	5915	5446	5697	5394	5697	5394	5697	5494	5797	5494	5797	5594	5894
5	Existing Solar	263	0	329	0	448	0	448	0	448	0	448	0	448	0	448	0	452	0	456	0	456	0	465	0	474	0	483	0	492	0
6	Demand Response	227	224	228	226	229	228	230	230	231	234	232	239	233	249	234	261	235	275	236	276	237	277	238	278	239	279	240	280	241	281
	Additions:																														
7	Solar Plant	67	0	118	0											4.4		4.4				8.8		8.8		8.8		8.8		8.8	
8	Peaking/Intermediate																		523	-38					100				100		100
9	Baseload																		553	-19											
10	Retirements	-25																	-1294	5											
11	Total System Capacity	6220	6139	6340	6141	6341	6143	6342	6145	6343	6149	6344	6154	6345	6164	6350	6176	6355	5972	6086	5973	6096	5974	6106	6075	6216	6076	6226	6177	6335	6278
12																															
13	Total Production Capability	6220	6139	6340	6141	6341	6143	6342	6145	6343	6149	6344	6154	6345	6164	6350	6176	6355	5972	6086	5973	6096	5974	6106	6075	6216	6076	6226	6177	6335	6278
Reserves																															
14	Margin (L13-L3)	1404	1248	1493	1217	1462	1188	1436	1182	1426	1157	1403	1133	1378	1113	1357	1100	1336	870.7	1045	821.7	1006	765.7	959.9	809.7	1015	757.7	969.5	802.7	1026	850.2
15	% Reserve Margin (L14/L3)	29.2%	25.5%	30.8%	24.7%	30.0%	24.0%	29.3%	23.8%	29.0%	23.2%	28.4%	22.6%	27.7%	22.0%	27.2%	21.7%	26.6%	17.1%	20.7%	15.9%	19.8%	14.7%	18.7%	15.4%	19.5%	14.2%	18.4%	14.9%	19.3%	15.7%

Appendix B

Appendix B

Resource Plan 1 _Med DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	Summer Demand Response (MW)	Winter Demand Response (MW)	CAPACITY CHANGES Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4924	228	226	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,141	1,217	24.7%	24.7%
2022	4879	4955	229	228	0	0	0		6,340	1,462	30.0%	6,143	1,188	24.0%	24.0%
2023	4905	4964	230	230	0	0	0		6,341	1,436	29.3%	6,145	1,182	23.8%	23.8%
2024	4916	4992	231	234	0	0	0		6,342	1,426	29.0%	6,149	1,157	23.2%	23.2%
2025	4941	5022	232	239	0	0	0		6,343	1,402	28.4%	6,154	1,133	22.6%	22.6%
2026	4967	5050	233	249	0	0	0		6,344	1,377	27.7%	6,164	1,113	22.0%	22.0%
2027	4993	5077	234	261	0	0	0		6,345	1,352	27.1%	6,176	1,100	21.7%	21.7%
2028	5019	5102	235	275	0	0	0		6,346	1,327	26.4%	6,190	1,089	21.3%	21.3%
2029	5041	5152	236	276	50	0	0		6,347	1,306	25.9%	6,191	1,040	20.2%	21.2%
2030	5090	5209	237	277	150	0	0		6,348	1,258	24.7%	6,192	984	18.9%	21.8%
2031	5146	5266	238	278	200	0	0		6,349	1,203	23.4%	6,193	928	17.6%	21.4%
2032	5201	5319	239	279	250	0	0		6,350	1,149	22.1%	6,194	876	16.5%	21.2%
2033	5256	5375	240	280	350	0	0		6,351	1,095	20.8%	6,195	821	15.3%	21.8%
2034	5309	5428	241	281	400	0	0		6,352	1,043	19.6%	6,196	769	14.2%	21.5%
2035	5361	5479	242	282	0	0	553	CC(553),	6,353	992	18.5%	6,750	1,272	23.2%	23.2%
2036	5414	5533	243	283	0	-19	0	Summer Cap.Adj.	6,888	1,474	27.2%	6,751	1,219	22.0%	22.0%
2037	5466	5587	244	284	50	0	0		6,889	1,423	26.0%	6,752	1,166	20.9%	21.8%
2038	5520	5640	245	284	100	0	0		6,890	1,370	24.8%	6,752	1,113	19.7%	21.5%
2039	5571	5694	245	285	150	0	0		6,890	1,319	23.7%	6,753	1,059	18.6%	21.2%
2040	5625	5749	246	286	250	0	0		6,891	1,266	22.5%	6,754	1,005	17.5%	21.8%
2041	5679	5805	247	287	300	0	0		6,892	1,212	21.3%	6,755	950	16.4%	21.5%
2042	5734	5861	247	288	350	0	0		6,893	1,158	20.2%	6,756	895	15.3%	21.2%
2043	5790	5918	248	288	450	0	0		6,893	1,103	19.1%	6,756	839	14.2%	21.8%
2044	5846	5975	249	289	150	0	362	Wateree(-684), ICT(523x2)	6,894	1,048	17.9%	7,119	1,144	19.2%	21.7%
2045	5903	6033	250	290	200	-76	0	Summer Cap.Adj.	7,181	1,278	21.7%	7,120	1,087	18.0%	21.3%
2046	5960	6091	251	291	250	0	0		7,182	1,222	20.5%	7,121	1,030	16.9%	21.0%
2047	6017	6150	252	292	450	0	-87	Williams(-610), ICT(523x1)	7,183	1,165	19.4%	7,035	885	14.4%	21.7%
2048	6076	6210	252	293	0	-38	523	ICT(523x1)	7,058	983	16.2%	7,559	1,349	21.7%	21.7%
2049	6135	6270	253	293	50	-38	0	Summer Cap.Adj.	7,544	1,410	23.0%	7,559	1,290	20.6%	21.4%

Resource Plan 2 _Med DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4924	228	226	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,141	1,217	24.7%	24.7%
2022	4879	4955	229	228	0	0	0		6,340	1,462	30.0%	6,143	1,188	24.0%	24.0%
2023	4905	4964	230	230	0	0	0		6,341	1,436	29.3%	6,145	1,182	23.8%	23.8%
2024	4916	4992	231	234	0	0	0		6,342	1,426	29.0%	6,149	1,157	23.2%	23.2%
2025	4941	5022	232	239	0	0	0		6,343	1,402	28.4%	6,154	1,133	22.6%	22.6%
2026	4967	5050	233	249	0	0	0		6,344	1,377	27.7%	6,164	1,113	22.0%	22.0%
2027	4993	5077	234	261	0	0	0		6,345	1,352	27.1%	6,176	1,100	21.7%	21.7%
2028	5019	5102	235	275	0	0	0		6,346	1,327	26.4%	6,190	1,089	21.3%	21.3%
2029	5041	5152	236	276	50	0	0		6,347	1,306	25.9%	6,191	1,040	20.2%	21.2%
2030	5090	5209	237	277	150	0	0		6,348	1,258	24.7%	6,192	984	18.9%	21.8%
2031	5146	5266	238	278	200	0	0		6,349	1,203	23.4%	6,193	928	17.6%	21.4%
2032	5201	5319	239	279	250	0	0		6,350	1,149	22.1%	6,194	876	16.5%	21.2%
2033	5256	5375	240	280	350	0	0		6,351	1,095	20.8%	6,195	821	15.3%	21.8%
2034	5309	5428	241	281	400	0	0		6,352	1,043	19.6%	6,196	769	14.2%	21.5%
2035	5361	5479	242	282	0	0	523	ICT(523)	6,353	992	18.5%	6,720	1,242	22.7%	22.7%
2036	5414	5533	243	283	0	-38	0	Summer Cap.Adj.	6,839	1,425	26.3%	6,721	1,189	21.5%	21.5%
2037	5466	5587	244	284	50	0	0		6,840	1,374	25.1%	6,722	1,136	20.3%	21.2%
2038	5520	5640	245	284	150	0	0		6,841	1,321	23.9%	6,722	1,083	19.2%	21.9%
2039	5571	5694	245	285	200	0	0		6,841	1,270	22.8%	6,723	1,029	18.1%	21.6%
2040	5625	5749	246	286	250	0	0		6,842	1,217	21.6%	6,724	975	17.0%	21.3%
2041	5679	5805	247	287	300	0	0		6,843	1,163	20.5%	6,725	920	15.8%	21.0%
2042	5734	5861	247	288	400	0	0		6,844	1,109	19.3%	6,726	865	14.8%	21.6%
2043	5790	5918	248	288	0	0	523	ICT(523)	6,844	1,054	18.2%	7,249	1,332	22.5%	22.5%
2044	5846	5975	249	289	150	-38	-161	Wateree(-684), ICT(523x1)	7,330	1,484	25.4%	7,089	1,114	18.6%	21.2%
2045	5903	6033	250	290	250	-38	0	Summer Cap.Adj.	7,132	1,229	20.8%	7,090	1,057	17.5%	21.7%
2046	5960	6091	251	291	300	0	0		7,133	1,173	19.7%	7,091	1,000	16.4%	21.3%
2047	6017	6150	252	292	0	0	436	Williams(-610), ICT(523x2)	7,134	1,116	18.5%	7,528	1,378	22.4%	22.4%
2048	6076	6210	252	293	0	-76	0	Summer Cap.Adj.	7,494	1,419	23.4%	7,529	1,319	21.2%	21.2%
2049	6135	6270	253	293	100	0	0		7,495	1,361	22.2%	7,529	1,260	20.1%	21.7%

Resource Plan 3 _Med DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4924	228	226	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,141	1,217	24.7%	24.7%
2022	4879	4955	229	228	0	0	0		6,340	1,462	30.0%	6,143	1,188	24.0%	24.0%
2023	4905	4964	230	230	0	0	0		6,341	1,436	29.3%	6,145	1,182	23.8%	23.8%
2024	4916	4992	231	234	0	0	0		6,342	1,426	29.0%	6,149	1,157	23.2%	23.2%
2025	4941	5022	232	239	0	0	0		6,343	1,402	28.4%	6,154	1,133	22.6%	22.6%
2026	4967	5050	233	249	0	0	0		6,344	1,377	27.7%	6,164	1,113	22.0%	22.0%
2027	4993	5077	234	261	0	0	0		6,345	1,352	27.1%	6,176	1,100	21.7%	21.7%
2028	5019	5102	235	275	150	0	-131	Wateree(-684), CC(553)	6,346	1,327	26.4%	6,059	958	18.8%	21.7%
2029	5041	5152	236	276	200	-19	0	Summer Cap.Adj.	6,197	1,156	22.9%	6,060	909	17.6%	21.5%
2030	5090	5209	237	277	250	0	0		6,198	1,108	21.8%	6,061	853	16.4%	21.2%
2031	5146	5266	238	278	350	0	0		6,199	1,053	20.5%	6,062	797	15.1%	21.8%
2032	5201	5319	239	279	0	0	523	ICT(523)	6,200	999	19.2%	6,586	1,268	23.8%	23.8%
2033	5256	5375	240	280	0	-38	0	Summer Cap.Adj.	6,686	1,430	27.2%	6,587	1,213	22.6%	22.6%
2034	5309	5428	241	281	0	0	0		6,687	1,378	26.0%	6,588	1,161	21.4%	21.4%
2035	5361	5479	242	282	50	0	0		6,688	1,327	24.8%	6,589	1,111	20.3%	21.2%
2036	5414	5533	243	283	150	0	0		6,689	1,275	23.6%	6,590	1,058	19.1%	21.8%
2037	5466	5587	244	284	200	0	0		6,690	1,224	22.4%	6,591	1,005	18.0%	21.6%
2038	5520	5640	245	284	250	0	0		6,691	1,171	21.2%	6,591	952	16.9%	21.3%
2039	5571	5694	245	285	300	0	0		6,691	1,120	20.1%	6,592	898	15.8%	21.0%
2040	5625	5749	246	286	400	0	0		6,692	1,067	19.0%	6,593	844	14.7%	21.6%
2041	5679	5805	247	287	0	0	523	ICT(523)	6,693	1,013	17.8%	7,117	1,312	22.6%	22.6%
2042	5734	5861	247	288	0	-38	0	Summer Cap.Adj.	7,179	1,444	25.2%	7,118	1,257	21.4%	21.4%
2043	5790	5918	248	288	50	0	0		7,179	1,389	24.0%	7,118	1,201	20.3%	21.1%
2044	5846	5975	249	289	150	0	0		7,180	1,334	22.8%	7,119	1,144	19.2%	21.7%
2045	5903	6033	250	290	200	0	0		7,181	1,278	21.7%	7,120	1,087	18.0%	21.3%
2046	5960	6091	251	291	250	0	0		7,182	1,222	20.5%	7,121	1,030	16.9%	21.0%
2047	6017	6150	252	292	450	0	-87	Williams(-610), ICT(523x1)	7,183	1,165	19.4%	7,035	885	14.4%	21.7%
2048	6076	6210	252	293	0	-38	523	ICT(523)	7,058	983	16.2%	7,559	1,349	21.7%	21.7%
2049	6135	6270	253	293	50	-38	0	Summer Cap.Adj.	7,544	1,410	23.0%	7,559	1,290	20.6%	21.4%

Resource Plan 4 _Med DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4924	228	226	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,141	1,217	24.7%	24.7%
2022	4879	4955	229	228	0	0	0		6,340	1,462	30.0%	6,143	1,188	24.0%	24.0%
2023	4905	4964	230	230	0	0	0		6,341	1,436	29.3%	6,145	1,182	23.8%	23.8%
2024	4916	4992	231	234	0	0	0		6,342	1,426	29.0%	6,149	1,157	23.2%	23.2%
2025	4941	5022	232	239	0	0	0		6,343	1,402	28.4%	6,154	1,133	22.6%	22.6%
2026	4967	5050	233	249	0	0	0		6,344	1,377	27.7%	6,164	1,113	22.0%	22.0%
2027	4993	5077	234	261	0	0	0		6,345	1,352	27.1%	6,176	1,100	21.7%	21.7%
2028	5019	5102	235	275	0	0	177	Retire MCM & Urq3, ICT(523x1)	6,346	1,327	26.4%	6,367	1,266	24.8%	24.8%
2029	5041	5152	236	276	0	-38	0	Summer Cap.Adj.	6,486	1,445	28.7%	6,368	1,217	23.6%	23.6%
2030	5090	5209	237	277	0	0	0		6,487	1,397	27.4%	6,369	1,161	22.3%	22.3%
2031	5146	5266	238	278	50	0	0		6,488	1,342	26.1%	6,370	1,105	21.0%	21.9%
2032	5201	5319	239	279	100	0	0		6,489	1,288	24.8%	6,371	1,053	19.8%	21.7%
2033	5256	5375	240	280	150	0	0		6,490	1,234	23.5%	6,372	998	18.6%	21.4%
2034	5309	5428	241	281	200	0	0		6,491	1,182	22.3%	6,373	946	17.4%	21.1%
2035	5361	5479	242	282	300	0	0		6,492	1,131	21.1%	6,374	896	16.3%	21.8%
2036	5414	5533	243	283	350	0	0		6,493	1,079	19.9%	6,375	843	15.2%	21.6%
2037	5466	5587	244	284	400	0	0		6,494	1,028	18.8%	6,376	790	14.1%	21.3%
2038	5520	5640	245	284	0	0	523	ICT(523)	6,495	975	17.7%	6,899	1,260	22.3%	22.3%
2039	5571	5694	245	285	0	-38	0	Summer Cap.Adj.	6,980	1,409	25.3%	6,900	1,206	21.2%	21.2%
2040	5625	5749	246	286	100	0	0		6,981	1,356	24.1%	6,901	1,152	20.0%	21.8%
2041	5679	5805	247	287	150	0	0		6,982	1,302	22.9%	6,902	1,097	18.9%	21.5%
2042	5734	5861	247	288	200	0	0		6,983	1,248	21.8%	6,903	1,042	17.8%	21.2%
2043	5790	5918	248	288	300	0	0		6,983	1,193	20.6%	6,903	986	16.7%	21.7%
2044	5846	5975	249	289	0	0	362	Wateree(-684), ICT(523x2)	6,984	1,138	19.5%	7,266	1,291	21.6%	21.6%
2045	5903	6033	250	290	50	-76	0	Summer Cap.Adj.	7,271	1,368	23.2%	7,267	1,234	20.5%	21.3%
2046	5960	6091	251	291	150	0	0		7,272	1,312	22.0%	7,268	1,177	19.3%	21.8%
2047	6017	6150	252	292	300	0	-87	Williams(-610), ICT(523x1)	7,273	1,255	20.9%	7,182	1,032	16.8%	21.7%
2048	6076	6210	252	293	350	-38	0	Summer Cap.Adj.	7,148	1,073	17.7%	7,183	973	15.7%	21.3%
2049	6135	6270	253	293	450	0	0		7,149	1,015	16.5%	7,183	914	14.6%	21.8%

Resource Plan 5 _Med DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% | Winter Reserve Margin 14% | Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4924	228	226	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,141	1,217	24.7%	24.7%
2022	4879	4955	229	228	0	0	0		6,340	1,462	30.0%	6,143	1,188	24.0%	24.0%
2023	4905	4964	230	230	0	0	0		6,341	1,436	29.3%	6,145	1,182	23.8%	23.8%
2024	4916	4992	231	234	0	0	0		6,342	1,426	29.0%	6,149	1,157	23.2%	23.2%
2025	4941	5022	232	239	0	0	0		6,343	1,402	28.4%	6,154	1,133	22.6%	22.6%
2026	4967	5050	233	249	0	0	100	Flexible Solar(400), Storage(100)	6,344	1,377	27.7%	6,264	1,213	24.0%	24.0%
2027	4993	5077	234	261	0	35	0	Summer Cap.Adj.	6,480	1,488	29.8%	6,276	1,200	23.6%	23.6%
2028	5019	5102	235	275	0	0	0		6,481	1,462	29.1%	6,290	1,189	23.3%	23.3%
2029	5041	5152	236	276	0	0	0		6,482	1,441	28.6%	6,291	1,140	22.1%	22.1%
2030	5090	5209	237	277	50	0	0		6,483	1,393	27.4%	6,292	1,084	20.8%	21.8%
2031	5146	5266	238	278	100	0	0		6,484	1,338	26.0%	6,293	1,028	19.5%	21.4%
2032	5201	5319	239	279	150	0	0		6,485	1,284	24.7%	6,294	976	18.3%	21.2%
2033	5256	5375	240	280	250	0	0		6,486	1,230	23.4%	6,295	921	17.1%	21.8%
2034	5309	5428	241	281	300	0	0		6,487	1,178	22.2%	6,296	869	16.0%	21.5%
2035	5361	5479	242	282	350	0	0		6,488	1,127	21.0%	6,297	819	14.9%	21.3%
2036	5414	5533	243	283	0	0	553	CC(553)	6,489	1,075	19.9%	6,851	1,319	23.8%	23.8%
2037	5466	5587	244	284	0	-19	0	Summer Cap.Adj.	7,024	1,558	28.5%	6,852	1,266	22.7%	22.7%
2038	5520	5640	245	284	0	0	0		7,025	1,505	27.3%	6,852	1,213	21.5%	21.5%
2039	5571	5694	245	285	50	0	0		7,025	1,454	26.1%	6,853	1,159	20.4%	21.2%
2040	5625	5749	246	286	150	0	0		7,026	1,401	24.9%	6,854	1,105	19.2%	21.8%
2041	5679	5805	247	287	200	0	0		7,027	1,347	23.7%	6,855	1,050	18.1%	21.5%
2042	5734	5861	247	288	250	0	0		7,028	1,293	22.6%	6,856	995	17.0%	21.2%
2043	5790	5918	248	288	350	0	0		7,029	1,239	21.4%	6,856	939	15.9%	21.8%
2044	5846	5975	249	289	50	0	362	Wateree(-684), ICT(523x2)	7,029	1,183	20.2%	7,219	1,244	20.8%	21.7%
2045	5903	6033	250	290	100	-76	0	Summer Cap.Adj.	7,316	1,414	23.9%	7,220	1,187	19.7%	21.3%
2046	5960	6091	251	291	150	0	0		7,317	1,357	22.8%	7,221	1,130	18.5%	21.0%
2047	6017	6150	252	292	350	0	-87	Retire Williams, ICT(523)	7,318	1,300	21.6%	7,135	985	16.0%	21.7%
2048	6076	6210	252	293	400	-38	0	Summer Cap.Adj.	7,194	1,118	18.4%	7,136	926	14.9%	21.4%
2049	6135	6270	253	293	0	0	523	ICT(523)	7,195	1,060	17.3%	7,659	1,390	22.2%	22.2%

Resource Plan 6 _Med DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4924	228	226	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,141	1,217	24.7%	24.7%
2022	4879	4955	229	228	0	0	0		6,340	1,462	30.0%	6,143	1,188	24.0%	24.0%
2023	4905	4964	230	230	0	0	0		6,341	1,436	29.3%	6,145	1,182	23.8%	23.8%
2024	4916	4992	231	234	0	0	0		6,342	1,426	29.0%	6,149	1,157	23.2%	23.2%
2025	4941	5022	232	239	0	0	0		6,343	1,402	28.4%	6,154	1,133	22.6%	22.6%
2026	4967	5050	233	249	0	0	0	Flexible Solar (400MW)	6,344	1,377	27.7%	6,164	1,113	22.0%	22.0%
2027	4993	5077	234	261	0	35	0	Summer Cap.Adj.	6,380	1,388	27.8%	6,176	1,100	21.7%	21.7%
2028	5019	5102	235	275	0	0	0		6,381	1,362	27.1%	6,190	1,089	21.3%	21.3%
2029	5041	5152	236	276	50	0	0		6,382	1,341	26.6%	6,191	1,040	20.2%	21.2%
2030	5090	5209	237	277	150	0	0		6,383	1,293	25.4%	6,192	984	18.9%	21.8%
2031	5146	5266	238	278	200	0	0		6,384	1,238	24.1%	6,193	928	17.6%	21.4%
2032	5201	5319	239	279	250	0	0		6,385	1,184	22.8%	6,194	876	16.5%	21.2%
2033	5256	5375	240	280	350	0	0		6,386	1,130	21.5%	6,195	821	15.3%	21.8%
2034	5309	5428	241	281	400	0	0		6,387	1,078	20.3%	6,196	769	14.2%	21.5%
2035	5361	5479	242	282	0	0	523	ICT(523)	6,388	1,027	19.2%	6,720	1,242	22.7%	22.7%
2036	5414	5533	243	283	0	-38	0	Summer Cap.Adj.	6,874	1,460	27.0%	6,721	1,189	21.5%	21.5%
2037	5466	5587	244	284	50	0	0		6,875	1,409	25.8%	6,722	1,136	20.3%	21.2%
2038	5520	5640	245	284	150	0	0		6,876	1,356	24.6%	6,722	1,083	19.2%	21.9%
2039	5571	5694	245	285	200	0	0		6,876	1,305	23.4%	6,723	1,029	18.1%	21.6%
2040	5625	5749	246	286	250	0	0		6,877	1,252	22.3%	6,724	975	17.0%	21.3%
2041	5679	5805	247	287	300	0	0		6,878	1,198	21.1%	6,725	920	15.8%	21.0%
2042	5734	5861	247	288	400	0	0		6,879	1,144	20.0%	6,726	865	14.8%	21.6%
2043	5790	5918	248	288	0	0	523	ICT(523)	6,880	1,090	18.8%	7,249	1,332	22.5%	22.5%
2044	5846	5975	249	289	150	-38	-161	Retire Wateree, ICT(523x1)	7,365	1,519	26.0%	7,089	1,114	18.6%	21.2%
2045	5903	6033	250	290	250	-38	0	Summer Cap.Adj.	7,167	1,265	21.4%	7,090	1,057	17.5%	21.7%
2046	5960	6091	251	291	300	0	0		7,168	1,208	20.3%	7,091	1,000	16.4%	21.3%
2047	6017	6150	252	292	0	0	436	Retire Williams, ICT(523x2)	7,169	1,151	19.1%	7,528	1,378	22.4%	22.4%
2048	6076	6210	252	293	0	-76	0	Summer Cap.Adj.	7,530	1,454	23.9%	7,529	1,319	21.2%	21.2%
2049	6135	6270	253	293	100	0	0		7,531	1,396	22.8%	7,529	1,260	20.1%	21.7%

Resource Plan 7 _Med DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	Summer Demand Response (MW)	Winter Demand Response (MW)	CAPACITY CHANGES Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4924	228	226	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,141	1,217	24.7%	24.7%
2022	4879	4955	229	228	0	0	0		6,340	1,462	30.0%	6,143	1,188	24.0%	24.0%
2023	4905	4964	230	230	0	0	0		6,341	1,436	29.3%	6,145	1,182	23.8%	23.8%
2024	4916	4992	231	234	0	0	0		6,342	1,426	29.0%	6,149	1,157	23.2%	23.2%
2025	4941	5022	232	239	0	0	0		6,343	1,402	28.4%	6,154	1,133	22.6%	22.6%
2026	4967	5050	233	249	0	0	100	Flexible Solar PPA (400), Storage (100)	6,344	1,377	27.7%	6,264	1,213	24.0%	24.0%
2027	4993	5077	234	261	0	35	0	Summer Cap.Adj.	6,480	1,488	29.8%	6,276	1,200	23.6%	23.6%
2028	5019	5102	235	275	0	0	0		6,481	1,462	29.1%	6,290	1,189	23.3%	23.3%
2029	5041	5152	236	276	0	0	0		6,482	1,441	28.6%	6,291	1,140	22.1%	22.1%
2030	5090	5209	237	277	50	0	0		6,483	1,393	27.4%	6,292	1,084	20.8%	21.8%
2031	5146	5266	238	278	100	0	0		6,484	1,338	26.0%	6,293	1,028	19.5%	21.4%
2032	5201	5319	239	279	150	0	0		6,485	1,284	24.7%	6,294	976	18.3%	21.2%
2033	5256	5375	240	280	250	0	0		6,486	1,230	23.4%	6,295	921	17.1%	21.8%
2034	5309	5428	241	281	300	0	0		6,487	1,178	22.2%	6,296	869	16.0%	21.5%
2035	5361	5479	242	282	350	0	0		6,488	1,127	21.0%	6,297	819	14.9%	21.3%
2036	5414	5533	243	283	0	0	523	ICT(523)	6,489	1,075	19.9%	6,821	1,289	23.3%	23.3%
2037	5466	5587	244	284	0	-38	0	Summer Cap.Adj.	6,975	1,509	27.6%	6,822	1,236	22.1%	22.1%
2038	5520	5640	245	284	50	0	0		6,976	1,456	26.4%	6,822	1,183	21.0%	21.9%
2039	5571	5694	245	285	100	0	0		6,976	1,405	25.2%	6,823	1,129	19.8%	21.6%
2040	5625	5749	246	286	150	0	0		6,977	1,352	24.0%	6,824	1,075	18.7%	21.3%
2041	5679	5805	247	287	200	0	0		6,978	1,298	22.9%	6,825	1,020	17.6%	21.0%
2042	5734	5861	247	288	300	0	0		6,979	1,244	21.7%	6,826	965	16.5%	21.6%
2043	5790	5918	248	288	350	0	0		6,980	1,190	20.5%	6,826	909	15.4%	21.3%
2044	5846	5975	249	289	50	0	362	Wateree(-684), ICT(523x2)	6,980	1,134	19.4%	7,189	1,214	20.3%	21.2%
2045	5903	6033	250	290	150	-76	0	Summer Cap.Adj.	7,267	1,365	23.1%	7,190	1,157	19.2%	21.7%
2046	5960	6091	251	291	200	0	0		7,268	1,308	22.0%	7,191	1,100	18.1%	21.3%
2047	6017	6150	252	292	350	0	-87	Williams(-610), ICT(523x1)	7,269	1,251	20.8%	7,105	955	15.5%	21.2%
2048	6076	6210	252	293	450	-38	0	Summer Cap.Adj.	7,145	1,069	17.6%	7,106	896	14.4%	21.7%
2049	6135	6270	253	293	0	0	523	ICT(523)	7,146	1,011	16.5%	7,629	1,360	21.7%	21.7%

Resource Plan 8 _Med DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% | Winter Reserve Margin 14% | Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	Summer Demand Response (MW)	Winter Demand Response (MW)	CAPACITY CHANGES Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4924	228	226	0	68	0	Solar PPAs	6,340	1,493	30.8%	6,141	1,217	24.7%	24.7%
2022	4879	4955	229	228	0	0	0		6,341	1,462	30.0%	6,143	1,188	24.0%	24.0%
2023	4905	4964	230	230	0	0	0		6,342	1,436	29.3%	6,145	1,182	23.8%	23.8%
2024	4916	4992	231	234	0	0	0		6,343	1,426	29.0%	6,149	1,157	23.2%	23.2%
2025	4941	5022	232	239	0	0	0		6,344	1,403	28.4%	6,154	1,133	22.6%	22.6%
2026	4967	5050	233	249	0	0	0	Solar (50)	6,345	1,378	27.7%	6,164	1,113	22.0%	22.0%
2027	4993	5077	234	261	0	4.4	0	Solar (50)	6,350	1,357	27.2%	6,176	1,100	21.7%	21.7%
2028	5019	5102	235	275	250	4.4	-218	Wateree(-684), Williams (-610), CC(553) ICT(523)	6,355	1,336	26.6%	5,972	871	17.1%	22.0%
2029	5041	5152	236	276	300	-52	0	Solar (100)	6,086	1,045	20.7%	5,973	822	15.9%	21.8%
2030	5090	5209	237	277	350	8.8	0	Solar (100)	6,096	1,006	19.8%	5,974	766	14.7%	21.4%
2031	5146	5266	238	278	300	8.8	100	Solar (100) w/ Storage (100)	6,106	960	18.7%	6,075	810	15.4%	21.1%
2032	5201	5319	239	279	400	8.8	0	Solar (100)	6,216	1,015	19.5%	6,076	758	14.2%	21.8%
2033	5256	5375	240	280	350	8.8	100	Solar (100) w/ Storage (100)	6,226	969	18.4%	6,177	803	14.9%	21.4%
2034	5309	5428	241	281	300	8.8	100	Solar (100) w/ Storage (100)	6,335	1,026	19.3%	6,278	851	15.7%	21.2%
2035	5361	5479	242	282	350	8.8	0	Solar (100)	6,445	1,084	20.2%	6,279	801	14.6%	21.0%
2036	5414	5533	243	283	300	8.8	131	ICT (131), Solar (100)	6,455	1,041	19.2%	6,411	879	15.9%	21.3%
2037	5466	5587	244	284	350	8.8	0	Solar (100)	6,596	1,130	20.7%	6,412	826	14.8%	21.0%
2038	5520	5640	245	284	300	8.8	131	ICT (131), Solar (100)	6,606	1,085	19.7%	6,543	904	16.0%	21.3%
2039	5571	5694	245	285	350	8.8	0	Solar (100)	6,745	1,174	21.1%	6,544	850	14.9%	21.1%
2040	5625	5749	246	286	300	8.8	131	ICT (131), Solar (100)	6,755	1,130	20.1%	6,676	927	16.1%	21.3%
2041	5679	5805	247	287	350	8.8	0	Solar (100)	6,896	1,216	21.4%	6,677	872	15.0%	21.0%
2042	5734	5861	247	288	350	8.8	100	Solar (100) w/ Storage (100)	6,905	1,171	20.4%	6,778	917	15.6%	21.6%
2043	5790	5918	248	288	400	8.8	0	Solar (100)	7,015	1,225	21.2%	6,778	861	14.5%	21.3%
2044	5846	5975	249	289	400	8.8	100	Solar (100) w/ Storage (100)	7,024	1,178	20.2%	6,879	904	15.1%	21.8%
2045	5903	6033	250	290	450	8.8	0	Solar (100)	7,134	1,231	20.9%	6,880	847	14.0%	21.5%
2046	5960	6091	251	291	400	8.8	100	Solar (100) w/ Storage (100)	7,144	1,184	19.9%	6,981	890	14.6%	21.2%
2047	6017	6150	252	292	400	8.8	100	Solar (100) w/ Storage (100)	7,253	1,236	20.5%	7,082	932	15.1%	21.7%
2048	6076	6210	252	293	450	8.8	0	Solar (100)	7,363	1,287	21.2%	7,083	873	14.1%	21.3%
2049	6135	6270	253	293	550	8.8		Summer Cap.Adj.	7,373	1,238	20.2%	7,083	814	13.0%	21.8%

Resource Plan 1 High DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% | Winter Reserve Margin 14% | Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	265	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,180	1,289	26.4%	26.4%
2021	4847	4911	228	268	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,183	1,272	25.9%	25.9%
2022	4866	4930	229	272	0	0	0		6,340	1,474	30.3%	6,187	1,257	25.5%	25.5%
2023	4880	4927	230	277	0	0	0		6,341	1,461	29.9%	6,192	1,265	25.7%	25.7%
2024	4878	4942	231	285	0	0	0		6,342	1,464	30.0%	6,200	1,258	25.5%	25.5%
2025	4886	4957	232	298	0	0	0		6,343	1,457	29.8%	6,213	1,256	25.3%	25.3%
2026	4895	4972	233	319	0	0	0		6,344	1,450	29.6%	6,234	1,262	25.4%	25.4%
2027	4903	4984	234	348	0	0	0		6,345	1,442	29.4%	6,263	1,279	25.7%	25.7%
2028	4912	4995	235	382	0	0	0		6,346	1,434	29.2%	6,297	1,302	26.1%	26.1%
2029	4917	5045	236	383	0	0	0		6,347	1,430	29.1%	6,298	1,253	24.8%	24.8%
2030	4966	5102	237	384	0	0	0		6,348	1,382	27.8%	6,299	1,197	23.5%	23.5%
2031	5022	5159	238	385	0	0	0		6,349	1,327	26.4%	6,300	1,141	22.1%	22.1%
2032	5077	5212	239	386	50	0	0		6,350	1,273	25.1%	6,301	1,089	20.9%	21.9%
2033	5132	5268	240	387	100	0	0		6,351	1,219	23.8%	6,302	1,034	19.6%	21.5%
2034	5185	5321	241	388	150	0	0		6,352	1,167	22.5%	6,303	982	18.5%	21.3%
2035	5237	5372	242	389	200	0	0		6,353	1,116	21.3%	6,304	932	17.3%	21.1%
2036	5290	5426	243	390	300	0	0		6,354	1,064	20.1%	6,305	879	16.2%	21.7%
2037	5342	5480	244	391	350	0	0		6,355	1,013	19.0%	6,306	826	15.1%	21.5%
2038	5396	5533	245	391	0	0	553	CC(553)	6,356	960	17.8%	6,859	1,326	24.0%	24.0%
2039	5447	5587	245	393	0	-19	0	Summer Cap. Adj.	6,890	1,443	26.5%	6,861	1,273	22.8%	22.8%
2040	5501	5642	246	394	0	0	0		6,891	1,391	25.3%	6,862	1,220	21.6%	21.6%
2041	5555	5698	247	396	50	0	0		6,893	1,337	24.1%	6,864	1,166	20.5%	21.3%
2042	5610	5754	249	398	100	0	0		6,894	1,283	22.9%	6,866	1,112	19.3%	21.1%
2043	5666	5811	250	400	200	0	0		6,895	1,229	21.7%	6,868	1,057	18.2%	21.6%
2044	5722	5868	251	402	400	0	-161	Wateree(-684), ICT(523x1)	6,896	1,174	20.5%	6,709	841	14.3%	21.2%
2045	5779	5926	252	404	0	-38	523	ICT(523)	6,699	920	15.9%	7,234	1,308	22.1%	22.1%
2046	5836	5985	254	406	50	-38	0	Summer Cap. Adj.	7,185	1,349	23.1%	7,236	1,252	20.9%	21.8%
2047	5894	6044	255	408	200	0	-87	Williams(-610), ICT(523x1)	7,186	1,292	21.9%	7,151	1,108	18.3%	21.6%
2048	5952	6103	256	411	250	-38	0	Summer Cap. Adj.	7,062	1,110	18.7%	7,154	1,050	17.2%	21.3%
2049	6011	6163	258	413	350	0	0		7,064	1,052	17.5%	7,156	992	16.1%	21.8%

Resource Plan 2 High DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	265	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,180	1,289	26.4%	26.4%
2021	4847	4911	228	268	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,183	1,272	25.9%	25.9%
2022	4866	4930	229	272	0	0	0		6,340	1,474	30.3%	6,187	1,257	25.5%	25.5%
2023	4880	4927	230	277	0	0	0		6,341	1,461	29.9%	6,192	1,265	25.7%	25.7%
2024	4878	4942	231	285	0	0	0		6,342	1,464	30.0%	6,200	1,258	25.5%	25.5%
2025	4886	4957	232	298	0	0	0		6,343	1,457	29.8%	6,213	1,256	25.3%	25.3%
2026	4895	4972	233	319	0	0	0		6,344	1,450	29.6%	6,234	1,262	25.4%	25.4%
2027	4903	4984	234	348	0	0	0		6,345	1,442	29.4%	6,263	1,279	25.7%	25.7%
2028	4912	4995	235	382	0	0	0		6,346	1,434	29.2%	6,297	1,302	26.1%	26.1%
2029	4917	5045	236	383	0	0	0		6,347	1,430	29.1%	6,298	1,253	24.8%	24.8%
2030	4966	5102	237	384	0	0	0		6,348	1,382	27.8%	6,299	1,197	23.5%	23.5%
2031	5022	5159	238	385	0	0	0		6,349	1,327	26.4%	6,300	1,141	22.1%	22.1%
2032	5077	5212	239	386	50	0	0		6,350	1,273	25.1%	6,301	1,089	20.9%	21.9%
2033	5132	5268	240	387	100	0	0		6,351	1,219	23.8%	6,302	1,034	19.6%	21.5%
2034	5185	5321	241	388	150	0	0		6,352	1,167	22.5%	6,303	982	18.5%	21.3%
2035	5237	5372	242	389	200	0	0		6,353	1,116	21.3%	6,304	932	17.3%	21.1%
2036	5290	5426	243	390	300	0	0		6,354	1,064	20.1%	6,305	879	16.2%	21.7%
2037	5342	5480	244	391	350	0	0		6,355	1,013	19.0%	6,306	826	15.1%	21.5%
2038	5396	5533	245	391	0	0	523	ICT(523)	6,356	960	17.8%	6,829	1,296	23.4%	23.4%
2039	5447	5587	245	393	0	-38	0	Summer Cap. Adj.	6,841	1,394	25.6%	6,831	1,243	22.3%	22.3%
2040	5501	5642	246	394	0	0	0		6,842	1,342	24.4%	6,832	1,190	21.1%	21.1%
2041	5555	5698	247	396	100	0	0		6,844	1,288	23.2%	6,834	1,136	19.9%	21.7%
2042	5610	5754	249	398	150	0	0		6,845	1,234	22.0%	6,836	1,082	18.8%	21.4%
2043	5666	5811	250	400	200	0	0		6,846	1,180	20.8%	6,838	1,027	17.7%	21.1%
2044	5722	5868	251	402	0	0	362	Wateree(-684), ICT(523x2)	6,847	1,125	19.7%	7,202	1,334	22.7%	22.7%
2045	5779	5926	252	404	0	-76	0	Summer Cap. Adj.	7,135	1,356	23.5%	7,204	1,278	21.6%	21.6%
2046	5836	5985	254	406	50	0	0		7,136	1,300	22.3%	7,206	1,222	20.4%	21.3%
2047	5894	6044	255	408	200	0	-87	Williams(-610), ICT(523x1)	7,137	1,243	21.1%	7,121	1,078	17.8%	21.1%
2048	5952	6103	256	411	300	-38	0	Summer Cap. Adj.	7,013	1,061	17.8%	7,124	1,020	16.7%	21.6%
2049	6011	6163	258	413	350	0	0		7,015	1,003	16.7%	7,126	962	15.6%	21.3%

Resource Plan 3 High DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% | Winter Reserve Margin 14% | Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES: Summer Demand Response (MW)	CAPACITY CHANGES: Winter Demand Response (MW)	CAPACITY CHANGES: Winter Peaking (MW)	CAPACITY CHANGES: Summer Long Term (MW)	CAPACITY CHANGES: Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	265	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,180	1,289	26.4%	26.4%
2021	4847	4911	228	268	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,183	1,272	25.9%	25.9%
2022	4866	4930	229	272	0	0	0		6,340	1,474	30.3%	6,187	1,257	25.5%	25.5%
2023	4880	4927	230	277	0	0	0		6,341	1,461	29.9%	6,192	1,265	25.7%	25.7%
2024	4878	4942	231	285	0	0	0		6,342	1,464	30.0%	6,200	1,258	25.5%	25.5%
2025	4886	4957	232	298	0	0	0		6,343	1,457	29.8%	6,213	1,256	25.3%	25.3%
2026	4895	4972	233	319	0	0	0		6,344	1,450	29.6%	6,234	1,262	25.4%	25.4%
2027	4903	4984	234	348	0	0	0		6,345	1,442	29.4%	6,263	1,279	25.7%	25.7%
2028	4912	4995	235	382	0	0	-131	Wateree(-684), CC(553)	6,346	1,434	29.2%	6,166	1,171	23.4%	23.4%
2029	4917	5045	236	383	0	-19	0	Summer Cap. Adj.	6,197	1,280	26.0%	6,167	1,122	22.2%	22.2%
2030	4966	5102	237	384	50	0	0		6,198	1,232	24.8%	6,168	1,066	20.9%	21.9%
2031	5022	5159	238	385	100	0	0		6,199	1,177	23.4%	6,169	1,010	19.6%	21.5%
2032	5077	5212	239	386	150	0	0		6,200	1,123	22.1%	6,170	958	18.4%	21.3%
2033	5132	5268	240	387	250	0	0		6,201	1,069	20.8%	6,171	903	17.1%	21.9%
2034	5185	5321	241	388	300	0	0		6,202	1,017	19.6%	6,172	851	16.0%	21.6%
2035	5237	5372	242	389	350	0	0		6,203	966	18.5%	6,173	801	14.9%	21.4%
2036	5290	5426	243	390	0	0	523	ICT(523)	6,204	914	17.3%	6,697	1,271	23.4%	23.4%
2037	5342	5480	244	391	0	-38	0	Summer Cap. Adj.	6,690	1,348	25.2%	6,698	1,218	22.2%	22.2%
2038	5396	5533	245	391	0	0	0		6,691	1,295	24.0%	6,698	1,165	21.1%	21.1%
2039	5447	5587	245	393	100	0	0		6,691	1,244	22.8%	6,700	1,112	19.9%	21.7%
2040	5501	5642	246	394	150	0	0		6,692	1,192	21.7%	6,701	1,059	18.8%	21.4%
2041	5555	5698	247	396	200	0	0		6,694	1,138	20.5%	6,703	1,005	17.6%	21.2%
2042	5610	5754	249	398	300	0	0		6,695	1,084	19.3%	6,705	951	16.5%	21.7%
2043	5666	5811	250	400	350	0	0		6,696	1,030	18.2%	6,707	896	15.4%	21.5%
2044	5722	5868	251	402	400	0	0		6,697	975	17.0%	6,709	841	14.3%	21.2%
2045	5779	5926	252	404	0	0	523	ICT(523)	6,699	920	15.9%	7,234	1,308	22.1%	22.1%
2046	5836	5985	254	406	50	-38	0	Summer Cap. Adj.	7,185	1,349	23.1%	7,236	1,252	20.9%	21.8%
2047	5894	6044	255	408	200	0	-87	Williams(-610), ICT(523x1)	7,186	1,292	21.9%	7,151	1,108	18.3%	21.6%
2048	5952	6103	256	411	250	-38	0	Summer Cap. Adj.	7,062	1,110	18.7%	7,154	1,050	17.2%	21.3%
2049	6011	6163	258	413	350	0	0		7,064	1,052	17.5%	7,156	992	16.1%	21.8%

Resource Plan 4 High DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% | Winter Reserve Margin 14% | Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	265	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,180	1,289	26.4%	26.4%
2021	4847	4911	228	268	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,183	1,272	25.9%	25.9%
2022	4866	4930	229	272	0	0	0		6,340	1,474	30.3%	6,187	1,257	25.5%	25.5%
2023	4880	4927	230	277	0	0	0		6,341	1,461	29.9%	6,192	1,265	25.7%	25.7%
2024	4878	4942	231	285	0	0	0		6,342	1,464	30.0%	6,200	1,258	25.5%	25.5%
2025	4886	4957	232	298	0	0	0		6,343	1,457	29.8%	6,213	1,256	25.3%	25.3%
2026	4895	4972	233	319	0	0	0		6,344	1,450	29.6%	6,234	1,262	25.4%	25.4%
2027	4903	4984	234	348	0	0	0		6,345	1,442	29.4%	6,263	1,279	25.7%	25.7%
2028	4912	4995	235	382	0	0	177	Retire MCM & Urq3, ICT(523x1)	6,346	1,434	29.2%	6,474	1,479	29.6%	29.6%
2029	4917	5045	236	383	0	-38	0	Summer Cap. Adj.	6,486	1,569	31.9%	6,475	1,430	28.3%	28.3%
2030	4966	5102	237	384	0	0	0		6,487	1,521	30.6%	6,476	1,374	26.9%	26.9%
2031	5022	5159	238	385	0	0	0		6,488	1,466	29.2%	6,477	1,318	25.5%	25.5%
2032	5077	5212	239	386	0	0	0		6,489	1,412	27.8%	6,478	1,266	24.3%	24.3%
2033	5132	5268	240	387	0	0	0		6,490	1,358	26.5%	6,479	1,211	23.0%	23.0%
2034	5185	5321	241	388	0	0	0		6,491	1,306	25.2%	6,480	1,159	21.8%	21.8%
2035	5237	5372	242	389	50	0	0		6,492	1,255	24.0%	6,481	1,109	20.6%	21.6%
2036	5290	5426	243	390	100	0	0		6,493	1,203	22.7%	6,482	1,056	19.5%	21.3%
2037	5342	5480	244	391	150	0	0		6,494	1,152	21.6%	6,483	1,003	18.3%	21.0%
2038	5396	5533	245	391	250	0	0		6,495	1,099	20.4%	6,483	950	17.2%	21.7%
2039	5447	5587	245	393	300	0	0		6,495	1,048	19.2%	6,485	897	16.1%	21.4%
2040	5501	5642	246	394	350	0	0		6,496	996	18.1%	6,486	844	15.0%	21.2%
2041	5555	5698	247	396	0	0	523	ICT(523)	6,498	942	17.0%	7,011	1,313	23.1%	23.1%
2042	5610	5754	249	398	0	-38	0	Summer Cap. Adj.	6,984	1,373	24.5%	7,013	1,259	21.9%	21.9%
2043	5666	5811	250	400	50	0	0		6,985	1,319	23.3%	7,015	1,204	20.7%	21.6%
2044	5722	5868	251	402	250	0	-161	Wateree(-684), ICT(523x1)	6,986	1,264	22.1%	6,856	988	16.8%	21.1%
2045	5779	5926	252	404	350	-38	0	Summer Cap. Adj.	6,789	1,010	17.5%	6,858	932	15.7%	21.6%
2046	5836	5985	254	406	400	0	0		6,790	954	16.3%	6,860	876	14.6%	21.3%
2047	5894	6044	255	408	50	0	436	Williams(-610), ICT(523x2)	6,791	897	15.2%	7,298	1,255	20.8%	21.6%
2048	5952	6103	256	411	100	-76	0	Summer Cap. Adj.	7,152	1,200	20.2%	7,301	1,197	19.6%	21.3%
2049	6011	6163	258	413	200	0	0		7,154	1,142	19.0%	7,303	1,139	18.5%	21.7%

Resource Plan 5 High DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% | Winter Reserve Margin 14% | Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	265	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,180	1,289	26.4%	26.4%
2021	4847	4911	228	268	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,183	1,272	25.9%	25.9%
2022	4866	4930	229	272	0	0	0		6,340	1,474	30.3%	6,187	1,257	25.5%	25.5%
2023	4880	4927	230	277	0	0	0		6,341	1,461	29.9%	6,192	1,265	25.7%	25.7%
2024	4878	4942	231	285	0	0	0		6,342	1,464	30.0%	6,200	1,258	25.5%	25.5%
2025	4886	4957	232	298	0	0	0		6,343	1,457	29.8%	6,213	1,256	25.3%	25.3%
2026	4895	4972	233	319	0	0	100	Flexible Solar(400), Storage(100)	6,344	1,450	29.6%	6,334	1,362	27.4%	27.4%
2027	4903	4984	234	348	0	35	0	Summer Cap. Adj.	6,480	1,577	32.2%	6,363	1,379	27.7%	27.7%
2028	4912	4995	235	382	0	0	0		6,481	1,569	31.9%	6,397	1,402	28.1%	28.1%
2029	4917	5045	236	383	0	0	0		6,482	1,565	31.8%	6,398	1,353	26.8%	26.8%
2030	4966	5102	237	384	0	0	0		6,483	1,517	30.6%	6,399	1,297	25.4%	25.4%
2031	5022	5159	238	385	0	0	0		6,484	1,462	29.1%	6,400	1,241	24.1%	24.1%
2032	5077	5212	239	386	0	0	0		6,485	1,408	27.7%	6,401	1,189	22.8%	22.8%
2033	5132	5268	240	387	0	0	0		6,486	1,354	26.4%	6,402	1,134	21.5%	21.5%
2034	5185	5321	241	388	50	0	0		6,487	1,302	25.1%	6,403	1,082	20.3%	21.3%
2035	5237	5372	242	389	100	0	0		6,488	1,251	23.9%	6,404	1,032	19.2%	21.1%
2036	5290	5426	243	390	200	0	0		6,489	1,199	22.7%	6,405	979	18.0%	21.7%
2037	5342	5480	244	391	250	0	0		6,490	1,148	21.5%	6,406	926	16.9%	21.5%
2038	5396	5533	245	391	300	0	0		6,491	1,095	20.3%	6,406	873	15.8%	21.2%
2039	5447	5587	245	393	400	0	0		6,491	1,044	19.2%	6,408	820	14.7%	21.8%
2040	5501	5642	246	394	0	0	553	CC(553)	6,493	992	18.0%	6,962	1,320	23.4%	23.4%
2041	5555	5698	247	396	0	-19	0	Summer Cap. Adj.	7,028	1,472	26.5%	6,964	1,266	22.2%	22.2%
2042	5610	5754	249	398	0	0	0		7,029	1,419	25.3%	6,966	1,212	21.1%	21.1%
2043	5666	5811	250	400	100	0	0		7,030	1,364	24.1%	6,968	1,157	19.9%	21.6%
2044	5722	5868	251	402	300	0	-161	Wateree(-684), ICT(523x1)	7,032	1,309	22.9%	6,809	941	16.0%	21.2%
2045	5779	5926	252	404	400	-38	0	Summer Cap. Adj.	6,834	1,055	18.3%	6,811	885	14.9%	21.7%
2046	5836	5985	254	406	0	0	523	ICT(523)	6,835	999	17.1%	7,336	1,352	22.6%	22.6%
2047	5894	6044	255	408	100	-38	-87	Retire Williams, ICT(523x1)	7,321	1,427	24.2%	7,251	1,208	20.0%	21.6%
2048	5952	6103	256	411	150	-38	0	Summer Cap. Adj.	7,198	1,245	20.9%	7,254	1,150	18.8%	21.3%
2049	6011	6163	258	413	250	0	0		7,199	1,188	19.8%	7,256	1,092	17.7%	21.8%

Resource Plan 6 High DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	265	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,180	1,289	26.4%	26.4%
2021	4847	4911	228	268	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,183	1,272	25.9%	25.9%
2022	4866	4930	229	272	0	0	0		6,340	1,474	30.3%	6,187	1,257	25.5%	25.5%
2023	4880	4927	230	277	0	0	0		6,341	1,461	29.9%	6,192	1,265	25.7%	25.7%
2024	4878	4942	231	285	0	0	0		6,342	1,464	30.0%	6,200	1,258	25.5%	25.5%
2025	4886	4957	232	298	0	0	0		6,343	1,457	29.8%	6,213	1,256	25.3%	25.3%
2026	4895	4972	233	319	0	0	0	Flexible Solar (400MW)	6,344	1,450	29.6%	6,234	1,262	25.4%	25.4%
2027	4903	4984	234	348	0	35	0	Summer Cap. Adj.	6,380	1,477	30.1%	6,263	1,279	25.7%	25.7%
2028	4912	4995	235	382	0	0	0		6,381	1,469	29.9%	6,297	1,302	26.1%	26.1%
2029	4917	5045	236	383	0	0	0		6,382	1,465	29.8%	6,298	1,253	24.8%	24.8%
2030	4966	5102	237	384	0	0	0		6,383	1,417	28.5%	6,299	1,197	23.5%	23.5%
2031	5022	5159	238	385	0	0	0		6,384	1,362	27.1%	6,300	1,141	22.1%	22.1%
2032	5077	5212	239	386	50	0	0		6,385	1,308	25.8%	6,301	1,089	20.9%	21.9%
2033	5132	5268	240	387	100	0	0		6,386	1,254	24.4%	6,302	1,034	19.6%	21.5%
2034	5185	5321	241	388	150	0	0		6,387	1,202	23.2%	6,303	982	18.5%	21.3%
2035	5237	5372	242	389	200	0	0		6,388	1,151	22.0%	6,304	932	17.3%	21.1%
2036	5290	5426	243	390	300	0	0		6,389	1,099	20.8%	6,305	879	16.2%	21.7%
2037	5342	5480	244	391	350	0	0		6,390	1,048	19.6%	6,306	826	15.1%	21.5%
2038	5396	5533	245	391	0	0	523	ICT(523)	6,391	995	18.4%	6,829	1,296	23.4%	23.4%
2039	5447	5587	245	393	0	-38	0	Summer Cap. Adj.	6,876	1,429	26.2%	6,831	1,243	22.3%	22.3%
2040	5501	5642	246	394	0	0	0		6,878	1,377	25.0%	6,832	1,190	21.1%	21.1%
2041	5555	5698	247	396	100	0	0		6,879	1,323	23.8%	6,834	1,136	19.9%	21.7%
2042	5610	5754	249	398	150	0	0		6,880	1,270	22.6%	6,836	1,082	18.8%	21.4%
2043	5666	5811	250	400	200	0	0		6,881	1,215	21.4%	6,838	1,027	17.7%	21.1%
2044	5722	5868	251	402	0	0	362	Retire Wateree, ICT(523x2)	6,883	1,160	20.3%	7,202	1,334	22.7%	22.7%
2045	5779	5926	252	404	0	-76	0	Summer Cap. Adj.	7,170	1,391	24.1%	7,204	1,278	21.6%	21.6%
2046	5836	5985	254	406	50	0	0		7,171	1,335	22.9%	7,206	1,222	20.4%	21.3%
2047	5894	6044	255	408	200	0	-87	Retire Williams, ICT(523x1)	7,172	1,278	21.7%	7,121	1,078	17.8%	21.1%
2048	5952	6103	256	411	300	-38	0	Summer Cap. Adj.	7,049	1,096	18.4%	7,124	1,020	16.7%	21.6%
2049	6011	6163	258	413	350	0	0		7,050	1,039	17.3%	7,126	962	15.6%	21.3%

Resource Plan 7 High DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	265	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,180	1,289	26.4%	26.4%
2021	4847	4911	228	268	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,183	1,272	25.9%	25.9%
2022	4866	4930	229	272	0	0	0		6,340	1,474	30.3%	6,187	1,257	25.5%	25.5%
2023	4880	4927	230	277	0	0	0		6,341	1,461	29.9%	6,192	1,265	25.7%	25.7%
2024	4878	4942	231	285	0	0	0		6,342	1,464	30.0%	6,200	1,258	25.5%	25.5%
2025	4886	4957	232	298	0	0	0		6,343	1,457	29.8%	6,213	1,256	25.3%	25.3%
2026	4895	4972	233	319	0	0	100	Flexible Solar PPA (400), Storage (100)	6,344	1,450	29.6%	6,334	1,362	27.4%	27.4%
2027	4903	4984	234	348	0	35	0	Summer Cap. Adj.	6,480	1,577	32.2%	6,363	1,379	27.7%	27.7%
2028	4912	4995	235	382	0	0	0		6,481	1,569	31.9%	6,397	1,402	28.1%	28.1%
2029	4917	5045	236	383	0	0	0		6,482	1,565	31.8%	6,398	1,353	26.8%	26.8%
2030	4966	5102	237	384	0	0	0		6,483	1,517	30.6%	6,399	1,297	25.4%	25.4%
2031	5022	5159	238	385	0	0	0		6,484	1,462	29.1%	6,400	1,241	24.1%	24.1%
2032	5077	5212	239	386	0	0	0		6,485	1,408	27.7%	6,401	1,189	22.8%	22.8%
2033	5132	5268	240	387	0	0	0		6,486	1,354	26.4%	6,402	1,134	21.5%	21.5%
2034	5185	5321	241	388	50	0	0		6,487	1,302	25.1%	6,403	1,082	20.3%	21.3%
2035	5237	5372	242	389	100	0	0		6,488	1,251	23.9%	6,404	1,032	19.2%	21.1%
2036	5290	5426	243	390	200	0	0		6,489	1,199	22.7%	6,405	979	18.0%	21.7%
2037	5342	5480	244	391	250	0	0		6,490	1,148	21.5%	6,406	926	16.9%	21.5%
2038	5396	5533	245	391	300	0	0		6,491	1,095	20.3%	6,406	873	15.8%	21.2%
2039	5447	5587	245	393	400	0	0		6,491	1,044	19.2%	6,408	820	14.7%	21.8%
2040	5501	5642	246	394	0	0	523	ICT(523)	6,493	992	18.0%	6,932	1,290	22.9%	22.9%
2041	5555	5698	247	396	0	-38	0	Summer Cap. Adj.	6,979	1,423	25.6%	6,934	1,236	21.7%	21.7%
2042	5610	5754	249	398	50	0	0		6,980	1,370	24.4%	6,936	1,182	20.5%	21.4%
2043	5666	5811	250	400	100	0	0		6,981	1,315	23.2%	6,938	1,127	19.4%	21.1%
2044	5722	5868	251	402	350	0	-161	Wateree(-684), ICT(523x1)	6,983	1,260	22.0%	6,779	911	15.5%	21.5%
2045	5779	5926	252	404	400	-38	0	Summer Cap. Adj.	6,785	1,006	17.4%	6,781	855	14.4%	21.2%
2046	5836	5985	254	406	0	0	523	ICT(523)	6,786	950	16.3%	7,306	1,322	22.1%	22.1%
2047	5894	6044	255	408	100	-38	-87	Williams(-610), ICT(523x1)	7,272	1,378	23.4%	7,221	1,178	19.5%	21.1%
2048	5952	6103	256	411	200	-38	0	Summer Cap. Adj.	7,149	1,196	20.1%	7,224	1,120	18.4%	21.6%
2049	6011	6163	258	413	250	0	0		7,150	1,139	18.9%	7,226	1,062	17.2%	21.3%

Resource Plan 8 High DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	265	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,180	1,289	26.4%	26.4%
2021	4847	4911	228	268	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,183	1,272	25.9%	25.9%
2022	4866	4930	229	272	0	0	0		6,340	1,474	30.3%	6,187	1,257	25.5%	25.5%
2023	4880	4927	230	277	0	0	0		6,341	1,461	29.9%	6,192	1,265	25.7%	25.7%
2024	4878	4942	231	285	0	0	0		6,342	1,464	30.0%	6,200	1,258	25.5%	25.5%
2025	4886	4957	232	298	0	0	0		6,343	1,457	29.8%	6,213	1,256	25.3%	25.3%
2026	4895	4972	233	319	0	0	0	Solar (50)	6,344	1,450	29.6%	6,234	1,262	25.4%	25.4%
2027	4903	4984	234	348	0	4.4	0	Solar (50)	6,350	1,446	29.5%	6,263	1,279	25.7%	25.7%
2028	4912	4995	235	382	0	4.4	-218	Wateree(-684), Williams (-610), CC(553), ICT(523)	6,355	1,443	29.4%	6,079	1,084	21.7%	21.7%
2029	4917	5045	236	383	50	-52	0	Solar (100)	6,086	1,169	23.8%	6,080	1,035	20.5%	21.5%
2030	4966	5102	237	384	100	8.8	0	Solar (100)	6,096	1,130	22.8%	6,081	979	19.2%	21.1%
2031	5022	5159	238	385	200	8.8	0	Solar (100)	6,106	1,084	21.6%	6,082	923	17.9%	21.8%
2032	5077	5212	239	386	250	8.8	0	Solar (100)	6,115	1,038	20.5%	6,083	871	16.7%	21.5%
2033	5132	5268	240	387	300	8.8	0	Solar (100)	6,125	993	19.4%	6,084	816	15.5%	21.2%
2034	5185	5321	241	388	400	8.8	0	Solar (100)	6,135	950	18.3%	6,085	764	14.4%	21.9%
2035	5237	5372	242	389	300	8.8	131	Aerodirvative (131), Solar (100)	6,145	908	17.3%	6,217	845	15.7%	21.3%
2036	5290	5426	243	390	350	8.8	0	Solar (100)	6,286	996	18.8%	6,218	792	14.6%	21.0%
2037	5342	5480	244	391	300	8.8	131	Aerodirvative (131), Solar (100)	6,295	953	17.8%	6,350	870	15.9%	21.4%
2038	5396	5533	245	391	350	8.8	0	Solar (100)	6,436	1,040	19.3%	6,350	817	14.8%	21.1%
2039	5447	5587	245	393	300	8.8	131	Aerodirvative (131), Solar (100)	6,445	998	18.3%	6,483	895	16.0%	21.4%
2040	5501	5642	246	394	350	8.8	0	Solar (100)	6,586	1,085	19.7%	6,484	842	14.9%	21.1%
2041	5555	5698	247	396	350	8.8	100	Solar (100) w/ Storage (100)	6,596	1,041	18.7%	6,586	888	15.6%	21.7%
2042	5610	5754	249	398	400	8.8	0	Solar (100)	6,706	1,096	19.5%	6,588	834	14.5%	21.4%
2043	5666	5811	250	400	350	8.8	100	Solar (100) w/ Storage (100)	6,716	1,050	18.5%	6,690	879	15.1%	21.2%
2044	5722	5868	251	402	450	8.8	0	Solar (100)	6,826	1,104	19.3%	6,692	824	14.0%	21.7%
2045	5779	5926	252	404	400	8.8	100	Solar (100) w/ Storage (100)	6,836	1,057	18.3%	6,794	868	14.7%	21.4%
2046	5836	5985	254	406	350	8.8	100	Solar (100) w/ Storage (100)	6,946	1,110	19.0%	6,896	912	15.2%	21.1%
2047	5894	6044	255	408	450	8.8	0	Solar (100)	7,056	1,162	19.7%	6,898	855	14.1%	21.6%
2048	5952	6103	256	411	400	8.8	100	Solar (100) w/ Storage (100)	7,066	1,114	18.7%	7,001	897	14.7%	21.3%
2049	6011	6163	258	413	500	8.8			7,176	1,165	19.4%	7,003	839	13.6%	21.7%

Resource Plan 1 _Low DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4934	228	225	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,140	1,206	24.4%	24.4%
2022	4889	4977	229	226	0	0	0		6,340	1,451	29.7%	6,141	1,164	23.4%	23.4%
2023	4928	4998	230	227	0	0	0		6,341	1,413	28.7%	6,142	1,144	22.9%	22.9%
2024	4952	5038	231	228	0	0	0		6,342	1,390	28.1%	6,143	1,105	21.9%	21.9%
2025	4990	5079	232	229	50	0	0		6,343	1,353	27.1%	6,144	1,065	21.0%	22.0%
2026	5029	5120	233	230	100	0	0		6,344	1,315	26.2%	6,145	1,025	20.0%	22.0%
2027	5069	5159	234	231	100	0	0		6,345	1,276	25.2%	6,146	987	19.1%	21.1%
2028	5109	5198	235	232	150	0	0		6,346	1,237	24.2%	6,147	949	18.3%	21.1%
2029	5146	5248	236	233	250	0	0		6,347	1,201	23.3%	6,148	900	17.1%	21.9%
2030	5195	5305	237	234	300	0	0		6,348	1,153	22.2%	6,149	844	15.9%	21.6%
2031	5251	5362	238	235	350	0	0		6,349	1,098	20.9%	6,150	788	14.7%	21.2%
2032	5306	5415	239	236	0	0	553	CC(553)	6,350	1,044	19.7%	6,704	1,289	23.8%	23.8%
2033	5361	5471	240	237	0	-19	0	Summer Cap. Adj.	6,885	1,524	28.4%	6,705	1,234	22.5%	22.5%
2034	5414	5524	241	238	0	0	0		6,886	1,472	27.2%	6,706	1,182	21.4%	21.4%
2035	5466	5575	242	239	50	0	0		6,887	1,421	26.0%	6,707	1,132	20.3%	21.2%
2036	5519	5629	243	240	150	0	0		6,888	1,369	24.8%	6,708	1,079	19.2%	21.8%
2037	5571	5683	244	241	200	0	0		6,889	1,318	23.7%	6,709	1,026	18.0%	21.6%
2038	5625	5736	245	241	250	0	0		6,890	1,265	22.5%	6,709	973	17.0%	21.3%
2039	5676	5791	245	242	300	0	0		6,890	1,214	21.4%	6,710	919	15.9%	21.1%
2040	5730	5846	246	243	400	0	0		6,891	1,161	20.3%	6,711	865	14.8%	21.6%
2041	5784	5901	247	243	0	0	523	Peaker(s)	6,892	1,107	19.1%	7,234	1,333	22.6%	22.6%
2042	5839	5957	247	244	0	-38	0	Summer Cap. Adj.	7,378	1,538	26.3%	7,235	1,278	21.4%	21.4%
2043	5895	6014	248	245	50	0	0		7,378	1,484	25.2%	7,236	1,222	20.3%	21.2%
2044	5951	6071	249	246	300	0	-161	Wateree(-684), ICT(523x1)	7,379	1,428	24.0%	7,076	1,005	16.5%	21.5%
2045	6007	6129	250	247	350	-38	0	Summer Cap. Adj.	7,181	1,174	19.5%	7,077	948	15.5%	21.2%
2046	6064	6187	251	248	450	0	0		7,182	1,117	18.4%	7,078	890	14.4%	21.7%
2047	6122	6246	252	248	50	0	436	Williams(-610), ICT(523x2)	7,183	1,061	17.3%	7,514	1,268	20.3%	21.1%
2048	6180	6305	252	249	150	-76	0	Summer Cap. Adj.	7,543	1,363	22.1%	7,515	1,210	19.2%	21.6%
2049	6239	6365	253	250	200	0	0		7,544	1,306	20.9%	7,516	1,151	18.1%	21.2%

Resource Plan 2 _Low DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% | Winter Reserve Margin 14% | Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4934	228	225	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,140	1,206	24.4%	24.4%
2022	4889	4977	229	226	0	0	0		6,340	1,451	29.7%	6,141	1,164	23.4%	23.4%
2023	4928	4998	230	227	0	0	0		6,341	1,413	28.7%	6,142	1,144	22.9%	22.9%
2024	4952	5038	231	228	0	0	0		6,342	1,390	28.1%	6,143	1,105	21.9%	21.9%
2025	4990	5079	232	229	50	0	0		6,343	1,353	27.1%	6,144	1,065	21.0%	22.0%
2026	5029	5120	233	230	100	0	0		6,344	1,315	26.2%	6,145	1,025	20.0%	22.0%
2027	5069	5159	234	231	100	0	0		6,345	1,276	25.2%	6,146	987	19.1%	21.1%
2028	5109	5198	235	232	150	0	0		6,346	1,237	24.2%	6,147	949	18.3%	21.1%
2029	5146	5248	236	233	250	0	0		6,347	1,201	23.3%	6,148	900	17.1%	21.9%
2030	5195	5305	237	234	300	0	0		6,348	1,153	22.2%	6,149	844	15.9%	21.6%
2031	5251	5362	238	235	350	0	0		6,349	1,098	20.9%	6,150	788	14.7%	21.2%
2032	5306	5415	239	236	0	0	523	ICT(523)	6,350	1,044	19.7%	6,674	1,259	23.2%	23.2%
2033	5361	5471	240	237	0	-38	0	Summer Cap. Adj.	6,836	1,475	27.5%	6,675	1,204	22.0%	22.0%
2034	5414	5524	241	238	50	0	0		6,837	1,423	26.3%	6,676	1,152	20.8%	21.8%
2035	5466	5575	242	239	100	0	0		6,838	1,372	25.1%	6,677	1,102	19.8%	21.6%
2036	5519	5629	243	240	150	0	0		6,839	1,320	23.9%	6,678	1,049	18.6%	21.3%
2037	5571	5683	244	241	200	0	0		6,840	1,269	22.8%	6,679	996	17.5%	21.0%
2038	5625	5736	245	241	300	0	0		6,841	1,216	21.6%	6,679	943	16.4%	21.7%
2039	5676	5791	245	242	350	0	0		6,841	1,165	20.5%	6,680	889	15.4%	21.4%
2040	5730	5846	246	243	400	0	0		6,842	1,112	19.4%	6,681	835	14.3%	21.1%
2041	5784	5901	247	243	0	0	523	ICT(523)	6,843	1,058	18.3%	7,204	1,303	22.1%	22.1%
2042	5839	5957	247	244	50	-38	0	Summer Cap. Adj.	7,329	1,489	25.5%	7,205	1,248	20.9%	21.8%
2043	5895	6014	248	245	100	0	0		7,329	1,435	24.3%	7,206	1,192	19.8%	21.5%
2044	5951	6071	249	246	350	0	-161	Wateree(-684), ICT(523x1)	7,330	1,379	23.2%	7,046	975	16.1%	21.8%
2045	6007	6129	250	247	400	-38	0	Summer Cap. Adj.	7,132	1,125	18.7%	7,047	918	15.0%	21.5%
2046	6064	6187	251	248	0	0	523	ICT(523)	7,133	1,068	17.6%	7,571	1,383	22.4%	22.4%
2047	6122	6246	252	248	100	-38	-87	Williams(-610), ICT(523x1)	7,619	1,497	24.4%	7,484	1,238	19.8%	21.4%
2048	6180	6305	252	249	150	-38	0	Summer Cap. Adj.	7,494	1,314	21.3%	7,485	1,180	18.7%	21.1%
2049	6239	6365	253	250	250	0	0		7,495	1,257	20.1%	7,486	1,121	17.6%	21.5%

Resource Plan 3 _Low DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4934	228	225	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,140	1,206	24.4%	24.4%
2022	4889	4977	229	226	0	0	0		6,340	1,451	29.7%	6,141	1,164	23.4%	23.4%
2023	4928	4998	230	227	0	0	0		6,341	1,413	28.7%	6,142	1,144	22.9%	22.9%
2024	4952	5038	231	228	0	0	0		6,342	1,390	28.1%	6,143	1,105	21.9%	21.9%
2025	4990	5079	232	229	50	0	0		6,343	1,353	27.1%	6,144	1,065	21.0%	22.0%
2026	5029	5120	233	230	100	0	0		6,344	1,315	26.2%	6,145	1,025	20.0%	22.0%
2027	5069	5159	234	231	100	0	0		6,345	1,276	25.2%	6,146	987	19.1%	21.1%
2028	5109	5198	235	232	300	0	-131	Wateree(-684), CC(553)	6,346	1,237	24.2%	6,016	818	15.7%	21.5%
2029	5146	5248	236	233	350	-19	0	Summer Cap. Adj.	6,197	1,051	20.4%	6,017	769	14.6%	21.3%
2030	5195	5305	237	234	0	0	523	ICT(523)	6,198	1,003	19.3%	6,541	1,236	23.3%	23.3%
2031	5251	5362	238	235	0	-38	0	Summer Cap. Adj.	6,684	1,433	27.3%	6,542	1,180	22.0%	22.0%
2032	5306	5415	239	236	50	0	0		6,685	1,379	26.0%	6,543	1,128	20.8%	21.7%
2033	5361	5471	240	237	100	0	0		6,686	1,325	24.7%	6,544	1,073	19.6%	21.4%
2034	5414	5524	241	238	150	0	0		6,687	1,273	23.5%	6,545	1,021	18.5%	21.2%
2035	5466	5575	242	239	250	0	0		6,688	1,222	22.4%	6,546	971	17.4%	21.9%
2036	5519	5629	243	240	300	0	0		6,689	1,170	21.2%	6,547	918	16.3%	21.6%
2037	5571	5683	244	241	350	0	0		6,690	1,119	20.1%	6,548	865	15.2%	21.4%
2038	5625	5736	245	241	400	0	0		6,691	1,066	19.0%	6,548	812	14.2%	21.1%
2039	5676	5791	245	242	0	0	523	ICT(523)	6,691	1,015	17.9%	7,072	1,281	22.1%	22.1%
2040	5730	5846	246	243	50	-38	0	Summer Cap. Adj.	7,177	1,447	25.3%	7,073	1,227	21.0%	21.8%
2041	5784	5901	247	243	100	0	0		7,178	1,393	24.1%	7,073	1,172	19.9%	21.6%
2042	5839	5957	247	244	150	0	0		7,179	1,339	22.9%	7,074	1,117	18.7%	21.3%
2043	5895	6014	248	245	250	0	0		7,179	1,285	21.8%	7,075	1,061	17.6%	21.8%
2044	5951	6071	249	246	300	0	0		7,180	1,229	20.7%	7,076	1,005	16.5%	21.5%
2045	6007	6129	250	247	350	0	0		7,181	1,174	19.5%	7,077	948	15.5%	21.2%
2046	6064	6187	251	248	450	0	0		7,182	1,117	18.4%	7,078	890	14.4%	21.7%
2047	6122	6246	252	248	50	0	436	Williams(-610), ICT(523x2)	7,183	1,061	17.3%	7,514	1,268	20.3%	21.1%
2048	6180	6305	252	249	150	-76	0	Summer Cap. Adj.	7,543	1,363	22.1%	7,515	1,210	19.2%	21.6%
2049	6239	6365	253	250	200	0	0		7,544	1,306	20.9%	7,516	1,151	18.1%	21.2%

Resource Plan 4 _Low DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% | Winter Reserve Margin 14% | Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4934	228	225	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,140	1,206	24.4%	24.4%
2022	4889	4977	229	226	0	0	0		6,340	1,451	29.7%	6,141	1,164	23.4%	23.4%
2023	4928	4998	230	227	0	0	0		6,341	1,413	28.7%	6,142	1,144	22.9%	22.9%
2024	4952	5038	231	228	0	0	0		6,342	1,390	28.1%	6,143	1,105	21.9%	21.9%
2025	4990	5079	232	229	50	0	0		6,343	1,353	27.1%	6,144	1,065	21.0%	22.0%
2026	5029	5120	233	230	100	0	0		6,344	1,315	26.2%	6,145	1,025	20.0%	22.0%
2027	5069	5159	234	231	100	0	0		6,345	1,276	25.2%	6,146	987	19.1%	21.1%
2028	5109	5198	235	232	0	0	177	Retire MCM & Urq3, ICT(523x1)	6,346	1,237	24.2%	6,324	1,126	21.7%	21.7%
2029	5146	5248	236	233	50	-38	0	Summer Cap. Adj.	6,486	1,340	26.0%	6,325	1,077	20.5%	21.5%
2030	5195	5305	237	234	100	0	0		6,487	1,292	24.9%	6,326	1,021	19.2%	21.1%
2031	5251	5362	238	235	200	0	0		6,488	1,237	23.6%	6,327	965	18.0%	21.7%
2032	5306	5415	239	236	250	0	0		6,489	1,183	22.3%	6,328	913	16.9%	21.5%
2033	5361	5471	240	237	300	0	0		6,490	1,129	21.1%	6,329	858	15.7%	21.2%
2034	5414	5524	241	238	400	0	0		6,491	1,077	19.9%	6,330	806	14.6%	21.8%
2035	5466	5575	242	239	0	0	523	ICT(523)	6,492	1,026	18.8%	6,854	1,279	22.9%	22.9%
2036	5519	5629	243	240	0	-38	0	Summer Cap. Adj.	6,978	1,459	26.4%	6,855	1,226	21.8%	21.8%
2037	5571	5683	244	241	50	0	0		6,979	1,408	25.3%	6,856	1,173	20.6%	21.5%
2038	5625	5736	245	241	100	0	0		6,980	1,355	24.1%	6,856	1,120	19.5%	21.3%
2039	5676	5791	245	242	200	0	0		6,980	1,304	23.0%	6,857	1,066	18.4%	21.9%
2040	5730	5846	246	243	250	0	0		6,981	1,251	21.8%	6,858	1,012	17.3%	21.6%
2041	5784	5901	247	243	300	0	0		6,982	1,197	20.7%	6,858	957	16.2%	21.3%
2042	5839	5957	247	244	350	0	0		6,983	1,143	19.6%	6,859	902	15.1%	21.0%
2043	5895	6014	248	245	450	0	0		6,983	1,089	18.5%	6,860	846	14.1%	21.5%
2044	5951	6071	249	246	150	0	362	Wateree(-684), ICT(523x2)	6,984	1,033	17.4%	7,223	1,152	19.0%	21.4%
2045	6007	6129	250	247	200	-76	0	Summer Cap. Adj.	7,271	1,264	21.0%	7,224	1,095	17.9%	21.1%
2046	6064	6187	251	248	300	0	0		7,272	1,207	19.9%	7,225	1,037	16.8%	21.6%
2047	6122	6246	252	248	450	0	-87	Williams(-610), ICT(523x1)	7,273	1,151	18.8%	7,138	892	14.3%	21.5%
2048	6180	6305	252	249	0	-38	523	ICT(523)	7,148	968	15.7%	7,662	1,357	21.5%	21.5%
2049	6239	6365	253	250	50	-38	0	Summer Cap. Adj.	7,634	1,396	22.4%	7,663	1,298	20.4%	21.2%

Resource Plan 5 _Low DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4934	228	225	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,140	1,206	24.4%	24.4%
2022	4889	4977	229	226	0	0	0		6,340	1,451	29.7%	6,141	1,164	23.4%	23.4%
2023	4928	4998	230	227	0	0	0		6,341	1,413	28.7%	6,142	1,144	22.9%	22.9%
2024	4952	5038	231	228	0	0	0		6,342	1,390	28.1%	6,143	1,105	21.9%	21.9%
2025	4990	5079	232	229	50	0	0		6,343	1,353	27.1%	6,144	1,065	21.0%	22.0%
2026	5029	5120	233	230	0	0	100	Flexible Solar(400), Storage(100)	6,344	1,315	26.2%	6,245	1,125	22.0%	22.0%
2027	5069	5159	234	231	0	35	0	Summer Cap. Adj.	6,480	1,412	27.8%	6,246	1,087	21.1%	21.1%
2028	5109	5198	235	232	50	0	0		6,481	1,372	26.8%	6,247	1,049	20.2%	21.1%
2029	5146	5248	236	233	150	0	0		6,482	1,336	26.0%	6,248	1,000	19.0%	21.9%
2030	5195	5305	237	234	200	0	0		6,483	1,288	24.8%	6,249	944	17.8%	21.6%
2031	5251	5362	238	235	250	0	0		6,484	1,233	23.5%	6,250	888	16.6%	21.2%
2032	5306	5415	239	236	350	0	0		6,485	1,179	22.2%	6,251	836	15.4%	21.9%
2033	5361	5471	240	237	400	0	0		6,486	1,125	21.0%	6,252	781	14.3%	21.6%
2034	5414	5524	241	238	0	0	553	CC(553)	6,487	1,073	19.8%	6,806	1,282	23.2%	23.2%
2035	5466	5575	242	239	0	-19	0	Summer Cap. Adj.	7,022	1,556	28.5%	6,807	1,232	22.1%	22.1%
2036	5519	5629	243	240	50	0	0		7,023	1,504	27.3%	6,808	1,179	20.9%	21.8%
2037	5571	5683	244	241	100	0	0		7,024	1,453	26.1%	6,809	1,126	19.8%	21.6%
2038	5625	5736	245	241	150	0	0		7,025	1,400	24.9%	6,809	1,073	18.7%	21.3%
2039	5676	5791	245	242	200	0	0		7,025	1,349	23.8%	6,810	1,019	17.6%	21.1%
2040	5730	5846	246	243	300	0	0		7,026	1,296	22.6%	6,811	965	16.5%	21.6%
2041	5784	5901	247	243	350	0	0		7,027	1,243	21.5%	6,811	910	15.4%	21.4%
2042	5839	5957	247	244	400	0	0		7,028	1,188	20.4%	6,812	855	14.3%	21.1%
2043	5895	6014	248	245	0	0	523	ICT(523)	7,029	1,134	19.2%	7,336	1,322	22.0%	22.0%
2044	5951	6071	249	246	200	-38	-161	Wateree(-684), ICT(523x1)	7,514	1,564	26.3%	7,176	1,105	18.2%	21.5%
2045	6007	6129	250	247	250	-38	0	Summer Cap. Adj.	7,316	1,309	21.8%	7,177	1,048	17.1%	21.2%
2046	6064	6187	251	248	350	0	0		7,317	1,253	20.7%	7,178	990	16.0%	21.7%
2047	6122	6246	252	248	0	0	436	Retire Williams, ICT(523x2)	7,318	1,196	19.5%	7,614	1,368	21.9%	21.9%
2048	6180	6305	252	249	50	-76	0	Summer Cap. Adj.	7,679	1,499	24.2%	7,615	1,310	20.8%	21.6%
2049	6239	6365	253	250	100	0	0		7,680	1,441	23.1%	7,616	1,251	19.6%	21.2%

Resource Plan 6 _Low DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% | Winter Reserve Margin 14% | Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4934	228	225	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,140	1,206	24.4%	24.4%
2022	4889	4977	229	226	0	0	0		6,340	1,451	29.7%	6,141	1,164	23.4%	23.4%
2023	4928	4998	230	227	0	0	0		6,341	1,413	28.7%	6,142	1,144	22.9%	22.9%
2024	4952	5038	231	228	0	0	0		6,342	1,390	28.1%	6,143	1,105	21.9%	21.9%
2025	4990	5079	232	229	50	0	0		6,343	1,353	27.1%	6,144	1,065	21.0%	22.0%
2026	5029	5120	233	230	100	0	0	Flexible Solar (400MW)	6,344	1,315	26.2%	6,145	1,025	20.0%	22.0%
2027	5069	5159	234	231	100	35	0	Summer Cap. Adj.	6,380	1,312	25.9%	6,146	987	19.1%	21.1%
2028	5109	5198	235	232	150	0	0		6,381	1,272	24.9%	6,147	949	18.3%	21.1%
2029	5146	5248	236	233	250	0	0		6,382	1,236	24.0%	6,148	900	17.1%	21.9%
2030	5195	5305	237	234	300	0	0		6,383	1,188	22.9%	6,149	844	15.9%	21.6%
2031	5251	5362	238	235	350	0	0		6,384	1,133	21.6%	6,150	788	14.7%	21.2%
2032	5306	5415	239	236	0	0	523	ICT(523)	6,385	1,079	20.3%	6,674	1,259	23.2%	23.2%
2033	5361	5471	240	237	0	-38	0	Summer Cap. Adj.	6,871	1,510	28.2%	6,675	1,204	22.0%	22.0%
2034	5414	5524	241	238	50	0	0		6,872	1,458	26.9%	6,676	1,152	20.8%	21.8%
2035	5466	5575	242	239	100	0	0		6,873	1,407	25.7%	6,677	1,102	19.8%	21.6%
2036	5519	5629	243	240	150	0	0		6,874	1,355	24.6%	6,678	1,049	18.6%	21.3%
2037	5571	5683	244	241	200	0	0		6,875	1,304	23.4%	6,679	996	17.5%	21.0%
2038	5625	5736	245	241	300	0	0		6,876	1,251	22.2%	6,679	943	16.4%	21.7%
2039	5676	5791	245	242	350	0	0		6,876	1,200	21.1%	6,680	889	15.4%	21.4%
2040	5730	5846	246	243	400	0	0		6,877	1,147	20.0%	6,681	835	14.3%	21.1%
2041	5784	5901	247	243	0	0	523	ICT(523)	6,878	1,094	18.9%	7,204	1,303	22.1%	22.1%
2042	5839	5957	247	244	50	-38	0	Summer Cap. Adj.	7,364	1,524	26.1%	7,205	1,248	20.9%	21.8%
2043	5895	6014	248	245	100	0	0		7,365	1,470	24.9%	7,206	1,192	19.8%	21.5%
2044	5951	6071	249	246	350	0	-161	Retire Wateree, ICT(523x1)	7,365	1,415	23.8%	7,046	975	16.1%	21.8%
2045	6007	6129	250	247	400	-38	0	Summer Cap. Adj.	7,167	1,160	19.3%	7,047	918	15.0%	21.5%
2046	6064	6187	251	248	0	0	523	ICT(523)	7,168	1,104	18.2%	7,571	1,383	22.4%	22.4%
2047	6122	6246	252	248	100	-38	-87	Retire Williams, ICT(523x1)	7,654	1,532	25.0%	7,484	1,238	19.8%	21.4%
2048	6180	6305	252	249	150	-38	0	Summer Cap. Adj.	7,530	1,350	21.8%	7,485	1,180	18.7%	21.1%
2049	6239	6365	253	250	250	0	0		7,531	1,292	20.7%	7,486	1,121	17.6%	21.5%

Resource Plan 7 _Low DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4934	228	225	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,140	1,206	24.4%	24.4%
2022	4889	4977	229	226	0	0	0		6,340	1,451	29.7%	6,141	1,164	23.4%	23.4%
2023	4928	4998	230	227	0	0	0		6,341	1,413	28.7%	6,142	1,144	22.9%	22.9%
2024	4952	5038	231	228	0	0	0		6,342	1,390	28.1%	6,143	1,105	21.9%	21.9%
2025	4990	5079	232	229	50	0	0		6,343	1,353	27.1%	6,144	1,065	21.0%	22.0%
2026	5029	5120	233	230	0	0	100	Flexible Solar PPA (400), Storage (100)	6,344	1,315	26.2%	6,245	1,125	22.0%	22.0%
2027	5069	5159	234	231	0	35	0	Summer Cap. Adj.	6,480	1,412	27.8%	6,246	1,087	21.1%	21.1%
2028	5109	5198	235	232	50	0	0		6,481	1,372	26.8%	6,247	1,049	20.2%	21.1%
2029	5146	5248	236	233	150	0	0		6,482	1,336	26.0%	6,248	1,000	19.0%	21.9%
2030	5195	5305	237	234	200	0	0		6,483	1,288	24.8%	6,249	944	17.8%	21.6%
2031	5251	5362	238	235	250	0	0		6,484	1,233	23.5%	6,250	888	16.6%	21.2%
2032	5306	5415	239	236	350	0	0		6,485	1,179	22.2%	6,251	836	15.4%	21.9%
2033	5361	5471	240	237	400	0	0		6,486	1,125	21.0%	6,252	781	14.3%	21.6%
2034	5414	5524	241	238	0	0	523	ICT(485)	6,487	1,073	19.8%	6,776	1,252	22.7%	22.7%
2035	5466	5575	242	239	0	-38	0	Summer Cap. Adj.	6,973	1,507	27.6%	6,777	1,202	21.6%	21.6%
2036	5519	5629	243	240	50	0	0		6,974	1,455	26.4%	6,778	1,149	20.4%	21.3%
2037	5571	5683	244	241	100	0	0		6,975	1,404	25.2%	6,779	1,096	19.3%	21.0%
2038	5625	5736	245	241	200	0	0		6,976	1,351	24.0%	6,779	1,043	18.2%	21.7%
2039	5676	5791	245	242	250	0	0		6,976	1,300	22.9%	6,780	989	17.1%	21.4%
2040	5730	5846	246	243	300	0	0		6,977	1,247	21.8%	6,781	935	16.0%	21.1%
2041	5784	5901	247	243	400	0	0		6,978	1,194	20.6%	6,781	880	14.9%	21.7%
2042	5839	5957	247	244	0	0	523	ICT(523)	6,979	1,139	19.5%	7,305	1,348	22.6%	22.6%
2043	5895	6014	248	245	0	-38	0	Summer Cap. Adj.	7,465	1,570	26.6%	7,306	1,292	21.5%	21.5%
2044	5951	6071	249	246	250	0	-161	Wateree(-684), ICT(523x1)	7,465	1,515	25.5%	7,146	1,075	17.7%	21.8%
2045	6007	6129	250	247	300	-38	0	Summer Cap. Adj.	7,267	1,260	21.0%	7,147	1,018	16.6%	21.5%
2046	6064	6187	251	248	350	0	0		7,268	1,204	19.8%	7,148	960	15.5%	21.2%
2047	6122	6246	252	248	0	0	436	Williams(-610), ICT(523x2)	7,269	1,147	18.7%	7,584	1,338	21.4%	21.4%
2048	6180	6305	252	249	50	-76	0	Summer Cap. Adj.	7,630	1,450	23.5%	7,585	1,280	20.3%	21.1%
2049	6239	6365	253	250	150	0	0		7,631	1,392	22.3%	7,586	1,221	19.2%	21.5%

Resource Plan 8 _Low DSM

Solar Summer Peak Capacity (Solar < 1000 MW) 46.0%
Solar Summer Capacity (Solar >1000 MW) 8.8%

Summer Reserve Margin 12% Winter Reserve Margin 14% Winter Peak Res Margin 21%

YEAR	Gross Summer Peak (MW)	Gross Winter Peak (MW)	CAPACITY CHANGES Summer Demand Response (MW)	Winter Demand Response (MW)	Winter Peaking (MW)	Summer Long Term (MW)	Winter Long Term (MW)	DESCRIPTION	Summer Capacity (MW)	Summer Reserve (MW)	Summer Reserve %	Winter Capacity (MW)	Winter Reserve (MW)	Winter Reserve %	Winter Peak Reserve %
2019	4701	4844	0	0	0	159	0	Solar PPAs	5,823	1,122	23.9%	5,915	1,071	22.1%	22.1%
2020	4816	4891	227	224	0	221	0	Solar PPAs	6,271	1,455	30.2%	6,139	1,248	25.5%	25.5%
2021	4847	4934	228	225	0	67	0	Solar PPAs	6,339	1,492	30.8%	6,140	1,206	24.4%	24.4%
2022	4889	4977	229	226	0	0	0		6,340	1,451	29.7%	6,141	1,164	23.4%	23.4%
2023	4928	4998	230	227	0	0	0		6,341	1,413	28.7%	6,142	1,144	22.9%	22.9%
2024	4952	5038	231	228	0	0	0		6,342	1,390	28.1%	6,143	1,105	21.9%	21.9%
2025	4990	5079	232	229	50	0	0		6,343	1,353	27.1%	6,144	1,065	21.0%	22.0%
2026	5029	5120	233	230	100	0	0	Solar (50)	6,344	1,315	26.2%	6,145	1,025	20.0%	22.0%
2027	5069	5159	234	231	100	4.4	0	Solar (50)	6,350	1,281	25.3%	6,146	987	19.1%	21.1%
2028	5109	5198	235	232	400	4.4	-218	Wateree(-684), Williams (-610), CC(553), ICT(523)	6,355	1,245	24.4%	5,929	731	14.1%	21.8%
2029	5146	5248	236	233	350	-52	100	Solar (100) w/ Storage (100)	6,086	940	18.3%	6,030	782	14.9%	21.6%
2030	5195	5305	237	234	300	8.8	100	Solar (100) w/ Storage (100)	6,196	1,001	19.3%	6,131	826	15.6%	21.2%
2031	5251	5362	238	235	400	8.8	0	Solar (100)	6,306	1,054	20.1%	6,132	770	14.4%	21.8%
2032	5306	5415	239	236	350	8.8	100	Solar (100) w/ Storage (100)	6,315	1,009	19.0%	6,233	818	15.1%	21.6%
2033	5361	5471	240	237	300	8.8	100	Solar (100) w/ Storage (100)	6,425	1,064	19.8%	6,334	863	15.8%	21.3%
2034	5414	5524	241	238	350	8.8	0	Solar (100)	6,535	1,121	20.7%	6,335	811	14.7%	21.0%
2035	5466	5575	242	239	300	8.8	131	Aerodirvative (131), Solar (100)	6,545	1,079	19.7%	6,467	892	16.0%	21.4%
2036	5519	5629	243	240	350	8.8	0	Solar (100)	6,686	1,166	21.1%	6,468	839	14.9%	21.1%
2037	5571	5683	244	241	300	8.8	131	Aerodirvative (131), Solar (100)	6,695	1,124	20.2%	6,600	917	16.1%	21.4%
2038	5625	5736	245	241	350	8.8	0	Solar (100)	6,836	1,211	21.5%	6,600	864	15.1%	21.2%
2039	5676	5791	245	242	300	8.8	131	Aerodirvative (131), Solar (100)	6,845	1,169	20.6%	6,732	941	16.3%	21.4%
2040	5730	5846	246	243	350	8.8	0	Solar (100)	6,986	1,256	21.9%	6,733	887	15.2%	21.2%
2041	5784	5901	247	243	450	8.8	0	Solar (100)	6,995	1,211	20.9%	6,733	832	14.1%	21.7%
2042	5839	5957	247	244	350	8.8	131	Aerodirvative (131), Solar (100)	7,005	1,165	20.0%	6,865	908	15.2%	21.1%
2043	5895	6014	248	245	450	8.8	0	Solar (100)	7,145	1,251	21.2%	6,866	852	14.2%	21.6%
2044	5951	6071	249	246	400	8.8	100	Solar (100) w/ Storage (100)	7,155	1,204	20.2%	6,967	896	14.8%	21.3%
2045	6007	6129	250	247	350	8.8	100	Solar (100) w/ Storage (100)	7,265	1,257	20.9%	7,068	939	15.3%	21.0%
2046	6064	6187	251	248	450	8.8	0	Solar (100)	7,374	1,310	21.6%	7,069	881	14.2%	21.5%
2047	6122	6246	252	248	400	8.8	100	Solar (100) w/ Storage (100)	7,384	1,262	20.6%	7,169	923	14.8%	21.2%
2048	6180	6305	252	249	400	8.8	100	Solar (100) w/ Storage (100)	7,493	1,313	21.3%	7,270	965	15.3%	21.6%
2049	6239	6365	253	250	450	8.8	0	Solar (100) w/ Storage (100)	7,603	1,364	21.9%	7,271	906	14.2%	21.3%

($000)

Scenario	Description	W2 Retire now	W1 retire 22	W1&2 retire 28	W1&2 retire 44	First Increment of New Gen	40 Yr Levelized NPV ($000)	40 Yr Levelized NPV Delta ($000)	Purchases & Sales	Capital Costs (including ELG)	2030 CO_2
Replace 2	Wat 2 is out until 4/1/22 while its generator is replaced [1,3,6]				x	1X1 CC	$1,209,807	$0	2,158	95,625	11,609,891
Replace 1	Wat 2 is out until 4/1/22 while its generator is replaced [1,3,5]				x	2X0 ICTs	$1,216,507	$6,701	2,963	66,996	11,609,891
Retire 4	Wat 2 is retired in 2020, Wat 1 is retired in 2028 [2,4,6]	x		x		1X1 CC	$1,216,981	$7,175	4,262	116,453	10,263,564
Retire 3	Wat 2 is retired in 2020, Wat 1 is retired in 2028 [2,4,5]	x		x		2X0 ICTs	$1,218,321	$8,514	7,210	73,858	10,659,559
Replace 3	Wat 2 is out until 4/1/22, Wat 1 & 2 are retired in 2028 [2,3,5]			x		2X0 ICTs	$1,222,192	$12,385	5,119	76,288	10,663,356
Replace 4	Wat 2 is out until 4/1/22, Wat 1 & 2 are retired in 2028 [2,3,6]			x		1X1 CC	$1,222,582	$12,776	2,470	120,421	10,263,564
Retire 2	Wat 2 is retired in 2020, Wat 1 runs to 2044 [1,4,6]	x			x	1X1 CC	$1,229,277	$19,470	4,022	115,015	10,584,638
Retire 1	Wat 2 is retired in 2020, Wat 1 runs to 2044 [1,4,5]	x			x	2X0 ICTs	$1,226,881	$17,074	5,785	74,458	11,045,939

Notes:
1. Assumes ELG costs are spent at Wateree
2. Assumes no ELG costs are spent at Wateree
3. Assumes all but $10M of repair/replace costs are covered by insurance
4. Wateree 2 FOM is moves to Wateree 1
5. First new capacity added is 2X0 523 MW F-class ICTs
6. First bew capacity added is 1X1 553 MW Advanced-class CC